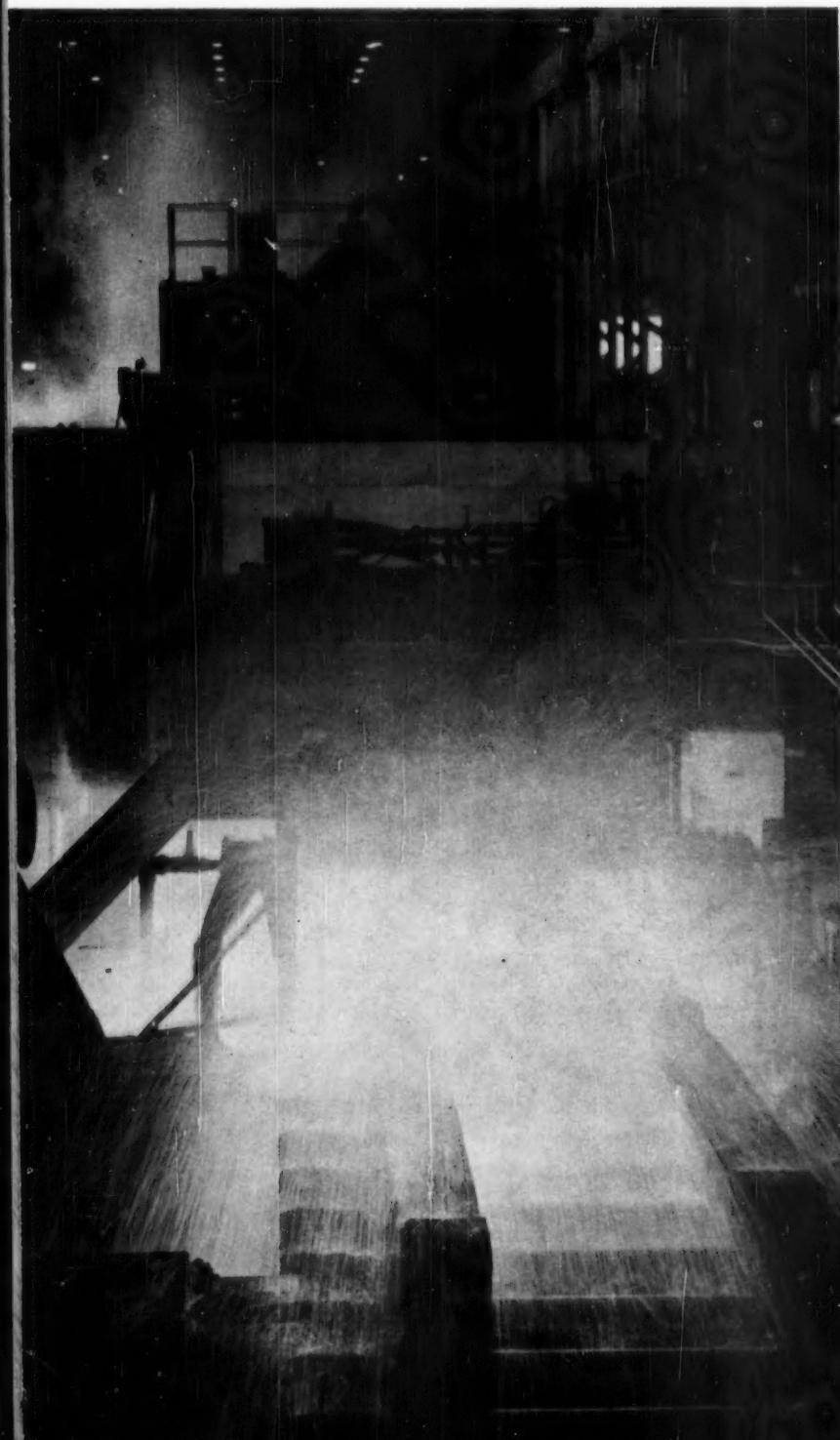


NOVEMBER 19, 1960

# Chemical Week

A McGRAW-HILL PUBLICATION PRICE FIFTY CENTS



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STEVEN RICE GS HS  
UNIVERSITY MICROFILMS  
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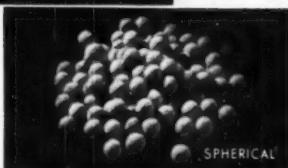
*and how they  
are used*



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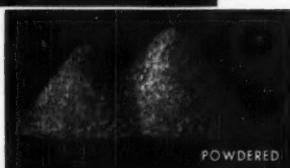
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FLAKES

## • DEHYDROGENATION CATALYSTS

**CHROME-ALUMINA**—available in powder or tablet form containing various percentages of chromium oxide supported on high surface area alumina—can be supplied as promoted catalyst and is also available as screened granules.

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**NICKEL-ALUMINA**—a spherical catalyst available as hard spheres measuring  $\frac{1}{4}$ " to 1" diameter—used for some types of gas reforming.

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**ON THE COVER:** Sparks shower from a massive slab of steel being surface-finished at U.S. Steel's Gary Steel Works. For profile of steel industry as chemical consumer, see p. 79.



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## Now's the Time to Invest

"COMPETING SUCCESSFULLY IN WORLD MARKETS . . . may well be management's most important sales problem in the next decade," said Bendix Corp. President Malcolm P. Ferguson a few weeks ago.

The election of Senator John F. Kennedy to the Presidency throws this problem into sharp and immediate focus, since it raises questions concerning our ability to compete in world markets. Despite President-elect Kennedy's avowed concern for the soundness of the dollar, it's uncertain how he can keep his platform commitments and still prevent its deterioration. His party's farm program, labor orientation, and cheap-money policy are only a few examples of the kind of thinking that will strain against the reins on inflation. If the reins should loosen, we would be hard-pressed to maintain competitive prices.

Time was when our production economies—high capital investment per worker, high output by virtue of our large domestic market—overcame the economy of low foreign wages. It's still true in many sectors of our industry, but the gap is narrowing as foreign plants approach ours in sophistication and common markets are formed to accommodate high output. We are like the four-minute miler who must struggle to the last gasp to knock two seconds off his time; our competitors are the five-minute milers who can with relative ease improve their time to 4:10.

How can we get that extra push? First of all, our continual high spending on research will inevitably bear the fruit of higher productivity as well as new products. Second, our investments in foreign manufacturing facilities will give us a profit opportunity in markets we can't reach with exports.

A third and very obvious way is to improve existing production facilities. Even if additional capacity isn't needed in the early '60s for many of our basic chemical and allied products, current capacity can be made more efficient by judicious capital investment. Example: Monsanto Chemical's \$300,000 computer installation to control its Luling, La., ammonia plant (*CW*, Nov. 5, p. 62). The company expects its investment to pay out in three years. New control instruments, new process equipment, new materials of construction, new materials-handling systems—these are all areas that offer cost-saving opportunities.

And this is a good time to make such investments. It's no secret that suppliers of such capital goods are in the same competitive bind as chemical process firms, and they're eager for our business. Stemming from this situation, too, is the fact that delivery times are relatively short. Getting back to that threat of inflation—if it should materialize, the need for production efficiency will be greater than it is today and it will then cost more to achieve it.

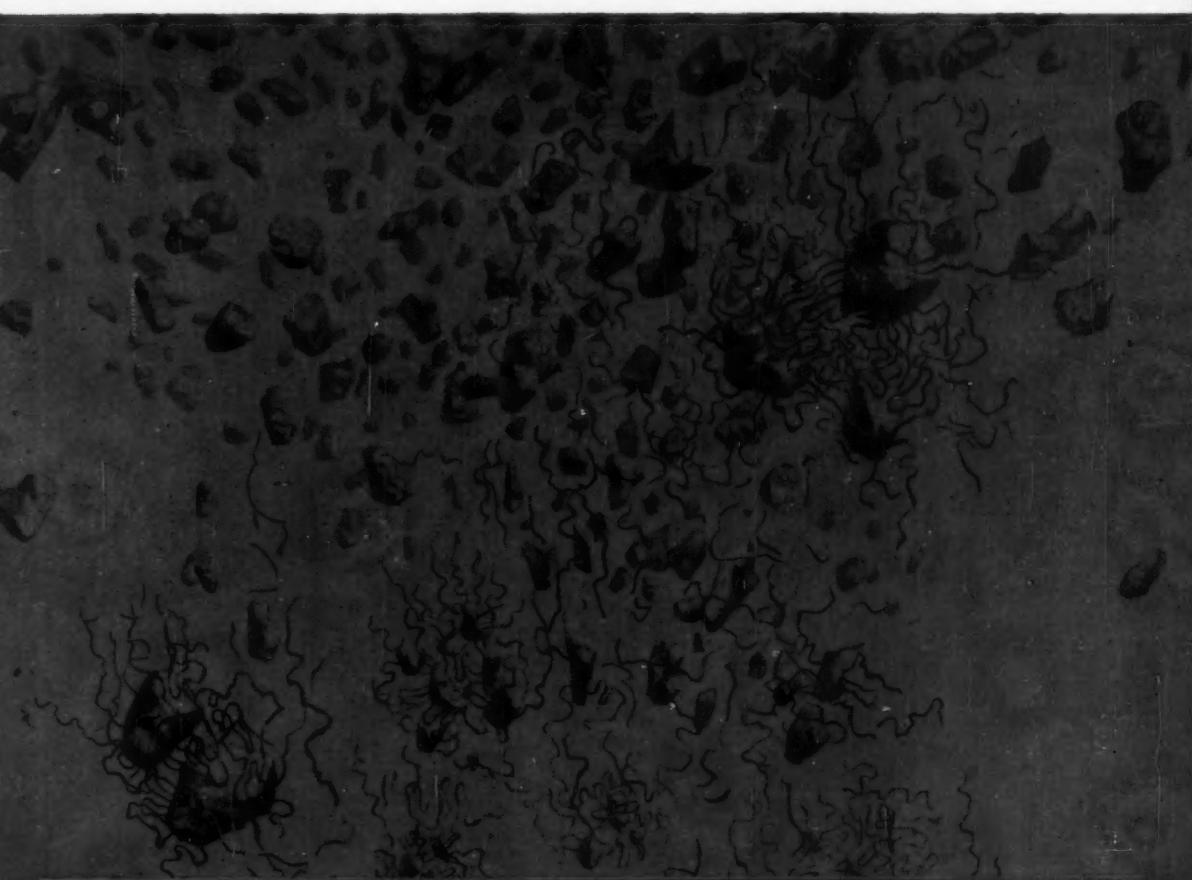
Also, despite generally slimmer profit margins, the chemical process industries have a high cash flow from retained earnings and depreciation. Very few firms are strapped for the money to invest.

All in all, then, we have the money, the means, and the motive to put our production facilities in fighting trim. Unless we enter the world trade fray with the best and sharpest weapons, we'll be licked by the resurgent industries of Europe and Japan whose plants are newer and more efficient than many of ours. We can win our share of world trade with competitively priced products, but it will take a combination of management vision, good engineering, and cash.

## CHEMICAL ISOLATION

**SPEED OF ACTION** and high purity of product distinguish the two different processes for chemical isolation on the next page.

In the first, a synthetic organic flocculant shows dramatic speed on a wide range of materials. The second is a petroleum extraction process yielding aromatics of extremely high purity.



**ACTION OF SEPARAN®** organic flocculant is illustrated above. (Separan flocculant is a high molecular weight polymer of acrylamide with some replacement of amide by carboxylic groups.) The molecules of the flocculant are represented as long chains containing numerous highly active sites. These sites have a high affinity for solid surfaces. Initially some active groups of the molecule attach themselves to the solids with a larger portion of the molecule extending into the solution. Agglomeration then begins in two ways—by bonding between the active groups of two separate molecules on different particles, or by the attachment of a molecule from one particle directly onto a second particle. Although this "bridging" is the major flocculation mechanism, Separan also tends to reduce the zeta potential (an expression of the electrical repulsion between particles).

## FLOCCULATION

# SYNTHETIC FLOCCULANT SHOWS WIDE-RANGE EFFECTIVENESS, SPEED

Separan NP10 flocculant is remarkably effective on a wide range of suspensions, from solids in river water to minerals and chemical precipitates. It is effective even when the suspending solution is strongly acidic or basic, or of high solids content. Particles ranging from colloidal clays to coarse sands are flocculated by this material.

Leaching operations create some of the most difficult liquid-solid separations encountered in the mining industry. Separan NP10 is used on leached zinc calcines prior to the electrolytic refining and recovery of zinc. It is used in the neutral or primary leach thickeners as well as in a number of thickening applications during the purification of the zinc electrolyte. In one large refinery, one to two pounds per day has made it possible to replace two to three men and to eliminate one filter press operation in the zinc solution purification step.

Separan NP10 is used in uranium mills to thicken the ore

pulp before leaching, to flocculate both acid- and carbonate-leached pulp, and to flocculate high grade precipitates. Many plants have increased the capacity of existing operations several times through the use of Separan NP10. In one installation, use of Separan NP10 allowed the elimination of four thickeners, six out of seven filters, and two settling ponds. As a result, the operating costs at this location were lowered by \$3000 a day.

The paper industry, too, has realized significant savings by using Separan flocculants for: filler retention, process water clarification, improved save-all operation, and clarification of white and green liquors.

Separan flocculants are generally adaptable to any operation which involves an aqueous liquid-solids separation such as thickening, clarification, and filtration. Examples include the production of alum, borax, phosphoric acid, magnesium, and the general area of industrial waste and water treatment.

## EXTRACTION

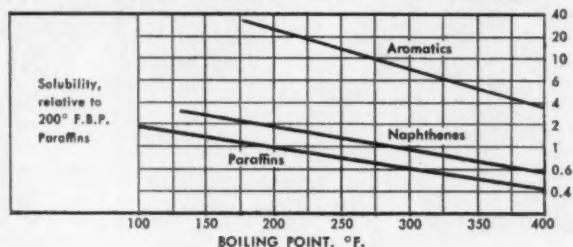
# ECONOMICAL UDEX PROCESS ENABLES BOTH LARGE AND SMALL REFINERS TO ENTER PETROCHEMICAL FIELD

Udex process, originated by Dow and developed for licensing by Universal Oil Products, is a selective liquid/liquid solvent extraction method for the separation and fractionation of aromatics from hydrocarbon mixtures. Extremely high product purity is obtained based on the solubility and selectivity differences between paraffins and aromatics in glycol solvents. Quality of the recovered benzene, toluene, and xylenes is of such high purity that in most cases the product will meet the specification for solvent grade material without further processing. Udex products usually exceed ASTM nitration-grade specifications.

The extraction solvents are Udex® brands of diethylene glycol, triethylene glycol, or dipropylene glycol, depending on the desired end product or feed-stock composition. These Udex polyglycols are high purity solvents developed specially by Dow for use in the Udex process. So selective are these solvents that several aromatics can be extracted simultaneously at high purity levels. Reduced utility requirements also result from the high boiling point of the glycols. This

allows direct distillation of the aromatics from the solvent. The glycols are noncorrosive, non-toxic, stable, relatively inexpensive, and readily available.

Octane improvement is a continuing problem for refiners who must constantly upgrade gasoline to meet higher octane requirements. A number of Udex units are used to extract aromatics from petroleum fractions. These aromatics are then blended into gasoline to boost the octane rating.



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## LETTERS

### Write Your Congressmen

TO THE EDITOR: I was discouraged by your comments (Aug. 20, p. 7) about writing to congressmen. I have written letters on several occasions and believe it is quite effective and much appreciated by our representatives. The important thing is to write about issues, or problems that involve issues, and remember to thank them for what you consider a good vote or stand on important matters.

Our senators and representatives are subject to a lot of professional education from pressure groups and public relations experts. Most of this, however well-intentioned, they take as favor-seeking . . .

I believe you have done your readers a disservice by discouraging them from writing individually to their congressmen. I believe it is the most effective way they can influence legislation and at the same time acquire a healthy interest in politics.

E. R. BLAIR  
Oak Park, Ill.

*Good idea. We simply said that most people don't write unless emotion—not reason—impels them to.—ED.*

### Exasperated Canadian

TO THE EDITOR: The feeling of frustration you talk about is sure to give way to a feeling of exasperation as a result of your editorial (Oct. 29, p. 5).

If Canada is an "artificial political entity," presumably you have discovered the magic recipe for a "natural" political entity. If the U. S. is your "natural" model, please take a quick look at a map and a glimpse through a history book.

Yes, the profitability of the Canadian chemical industry is low. Other industries, including rubber products, electrical apparatus and textiles, are even lower. In fact, "All manufacturing" is well below the chemical industry's earnings.

How on earth would a common market with the U. S. increase profitability of existing investment and employment in secondary industry? It would have only the opposite effect. Our difficulties are due to obsolete policies on the part of our government and a sentimental attachment to the deceptive idea of "free trade," which bears no relation to

the current technological, political and market realities of the world. Many influential Canadians have been voicing concern and trying to propagate the simple idea that if Canada does not look after itself, nobody else will. The U. S. has never been guilty of knowingly neglecting its own interests and I hope it never will.

The American stockholder who owns the major share of our chemical industry is interested in getting a return on the investment he has made and not in losing it.

His Canadian management would be seriously amiss if they did not strive to produce that return. We are not frustrated, Mr. Editor, we are fighting, and will continue to fight, for a healthier Canada and our national identity.

A. MONSAROFF  
Executive Vice-President  
Monsanto Canada Ltd.  
Montreal

### MEETINGS

**Manufacturing Chemists' Assn.**, 10th semiannual meeting and midyear conference, Hotel Statler Hilton, New York, Nov. 22.

**Glass Container Manufacturers' Institute**, semiannual meeting, Boca Raton, Fla., Nov. 28-Dec. 1.

**Fourth annual conference of Food & Drug Administration and the Food Law Institute**, Auditorium of the Dept. of Health, Education & Welfare, Washington, D.C., Nov. 28-29.

**American Institute of Consulting Engineers**, annual dinner, Waldorf Astoria Hotel, New York, Nov. 29.

**Midwest Research Institute and Chemical Engineering magazine**, cosponsored conference on new chemical engineering; Hotel Muehlebach, Kansas City, Mo., Nov. 29-30.

**Second International Reinforced Plastics Conference**, sponsored by the British Plastics Federation, Cafe Royal, London, Nov. 30-Dec. 2.

**American Institute of Chemical Engineers**, annual meeting; theme: chemical engineering in government programs; Statler Hilton Hotel, Washington, D.C., Dec. 4-7.

**American Nuclear Society**, annual winter meeting, Mark Hopkins and Fairmont hotels, San Francisco, Dec. 12-14. Two highlights: talk on transuranium elements by Glenn T. Seaborg; and the Atom Fair, jointly sponsored by ANS and the Atomic Industrial Forum at the Masonic Temple, San Francisco, Dec. 12-16.

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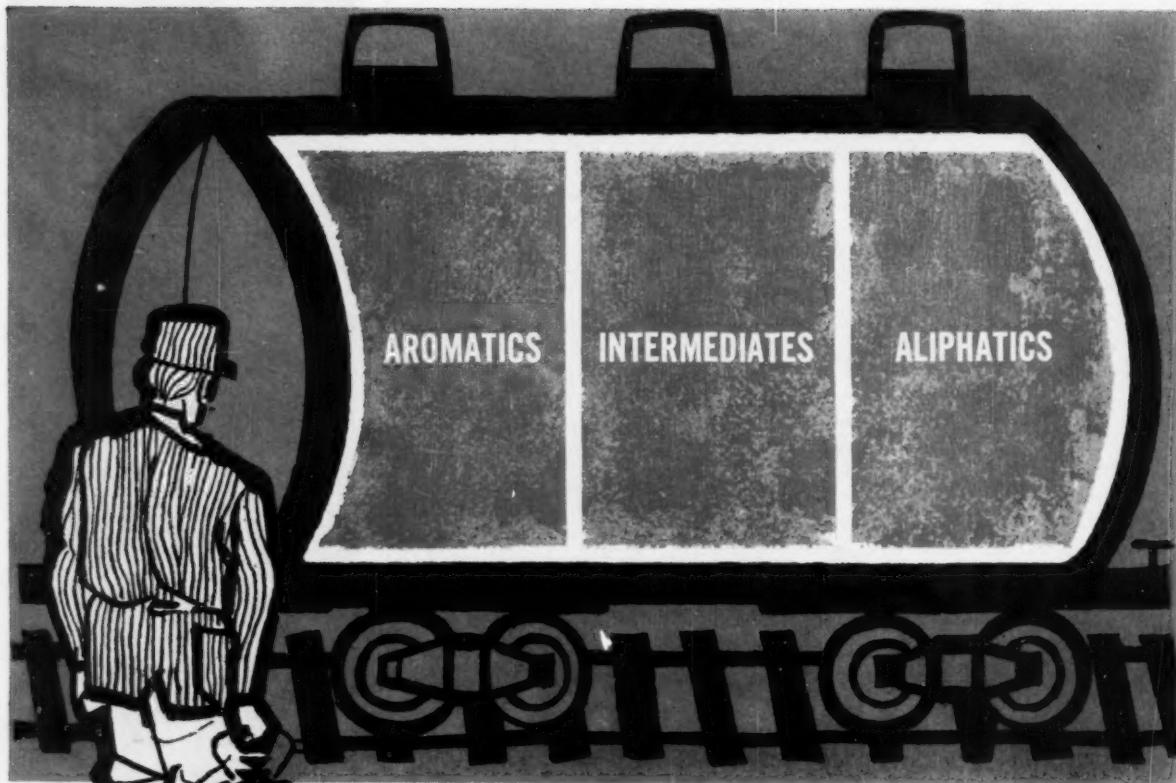
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# Chemical Newsfront

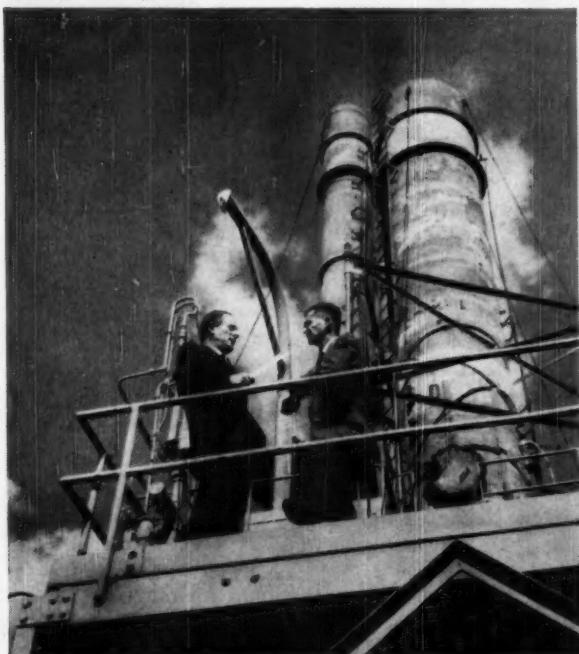


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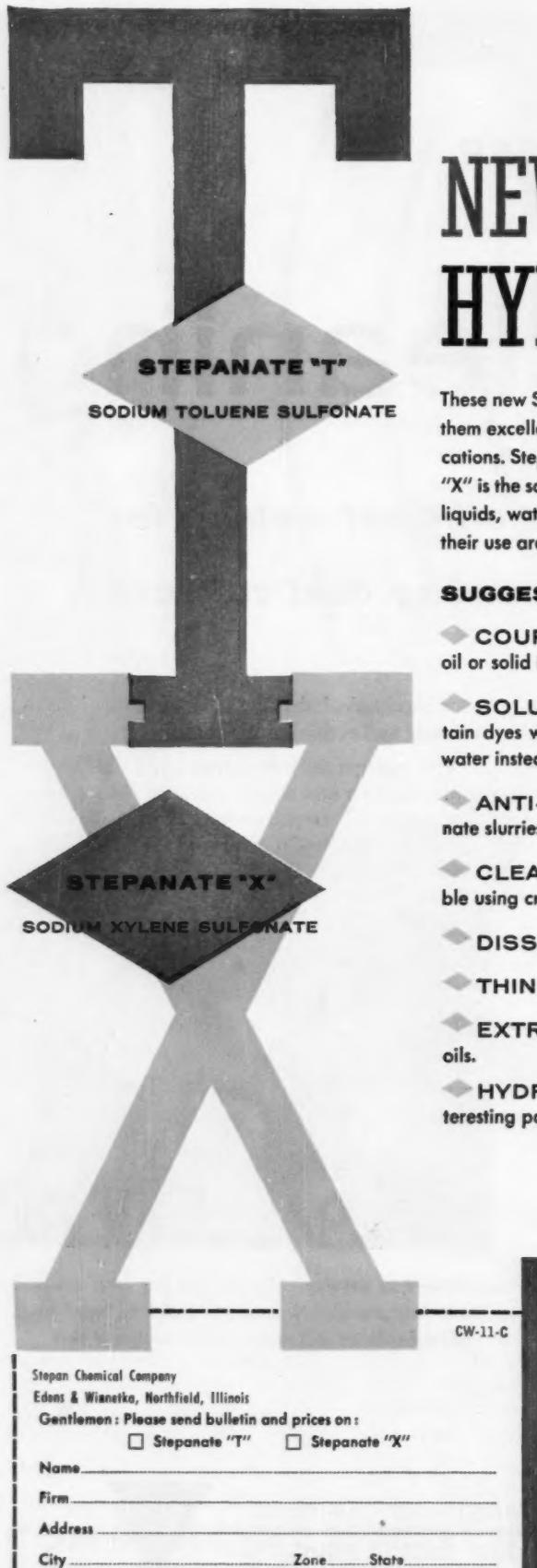


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# Business Newsletter

CHEMICAL WEEK  
November 19, 1960

**Next year's capital spending may top this year's total (see p. 21).** Among leading producers, the outlook is for '61 capital budgets to equal or exceed current levels. Du Pont, for example, says its '61 capital expenditures will be "approximately the same" as this year's \$210-220 million. Union Carbide says it's spending slightly more than \$200 million on new plant and equipment this year, will probably spend slightly less than \$200 million next year. Dow Chemical puts its capital outlays for fiscal year '60 (ended May 31) at \$102 million, has made a preliminary estimate of \$150 million for fiscal '61. Allied Chemical has pegged its capital spending at about \$85 million for each year, '61 and '62—more than double the '59 outlay.

**Canada will have its own source** of SBR latex-carbon black masterbatches: a new, \$1-million production facility to be put up by Polymer Corp. at Sarnia, Ont. Polymer's decision, long awaited, means that chances will be slim for the GATT-negotiated reclassification of these products as raw rubber instead of rubber products, as requested by 10 U.S. producers. The reclassification would have reduced the 20% tariff to 5%. Delaying Polymer's decision were a contamination problem (solved by setting up a separate line) and uncertainty about the market. The company expects to make sales to most Canadian tire manufacturers.

**Ownership of a new Australian petrochemical complex** being built at Altona, Victoria, will be affected by the splitup of the assets of Standard-Vacuum Oil Co., international operating company owned jointly by Socony Mobil and Standard of New Jersey. Each owning company will take 50% of Altona Petrochemical Co. Pty. Ltd., which is building polyethylene and polystyrene plants there. They will be operated by the Jersey concern. Each will have 35% of Australian Synthetic Rubber Co., Ltd. (Goodyear Tire & Rubber Co. owns the other 30%), which is building a GRS plant at the same site. The Jersey company terminated its participation in Standard-Vacuum under terms of a consent decree in a civil antitrust case; Socony was not a party to the decree. Gulf Oil also signed a consent decree, leaving suits still pending against three companies in the seven-year antitrust action. Still to be settled: separate suits against Socony Mobil, Texas Co., California Standard.

**Rhodia, Inc. (New York),** plans to make ethyl vanillin by a new process at its plant in New Brunswick, N. J.; onstream date is '61. Monsanto Chemical—principal U.S. producer—is said to be weighing a shift from benzene to lignin as the starting material for its ethyl vanillin. Monsanto already uses lignin as raw material for vanillin production at Seattle, Wash. Fries Bros. (Carlstadt, N.J.) is believed to be the only other ethyl producer in the U.S.

Rhodia pegs U.S. consumption at 400,000 lbs./year, which

## Business Newsletter

(Continued)

would represent an approximately \$2.2-million market. But other industry sources say halving those figures would be "more realistic."

**Century Chemical appeared to be on its last legs this week.** In a hearing before Herbert Lowenthal—who had been appointed by Federal District Judge Edward Dimmock to serve as referee in bankruptcy proceedings (*CW, Oct. 1, p. 25*)—both Century and its affiliate, Chemo Puro Mfg. Corp., have been adjudged bankrupt. Lowenthal named Donald Vincent as trustee; and Vincent promptly petitioned for leave to keep the companies operating for another 30 days. Lowenthal was expected to act on this request by the middle of this week.

**The General Aniline & Film case is right where it was**—in the hands of a special federal court master. The U.S. Supreme Court this week turned down a request by the Justice Dept. to transfer jurisdiction over the 10-year-old GAF ownership dispute to a federal court judge. Justice contended that this would have speeded settlement. The government seized \$100 million in GAF shares, totaling about 93% of the company's outstanding stock, under the World War II Trading with the Enemy Act. It is the government's charge that the Swiss firm Interhandel, which owned the shares, actually was a cloak for the German I.G. Farben interests.

**A new fresh-water supply** for the CPI-heavy southwest Louisiana and southeast Texas area was approved by Louisiana voters on election day. A state constitutional amendment was passed authorizing the Louisiana government to lend up to \$15 million toward the cost of construction of the Toledo Bend reservoir on the Sabine River, 18 miles west of Leesville, La., and about 70 miles north of Orange, Tex., and Lake Charles, La. In January, the Texas legislature is expected to match Louisiana's tax funds; and an additional \$30 million will be raised with revenue bonds.

The dam will create a 180,000-acre lake holding 4 million acre-ft. of fresh water. A further aid to the local CPI: the dam will increase flow of the Sabine River, making it usable for waste disposal.

**Californians also voted for a big water project**—in this case an aqueduct and dam system to bring northern California surpluses to thirsty southern California. Voters approved a \$1.75-billion bond issue for the project. Keystone will be the Oroville Dam, north of San Francisco, on which construction is scheduled to start in '62.

A more ample water supply in southern California will be a factor in CPI expansion plans, but probably more significant will be the creation of new markets. Much of the water will be used to irrigate new farm land—land that will likely need large amounts of fertilizers and other ag chemicals. In addition, more people and more industry of all kinds will be attracted to southern California, increasing the West Coast market for most goods.



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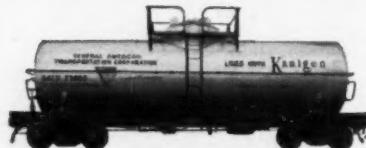
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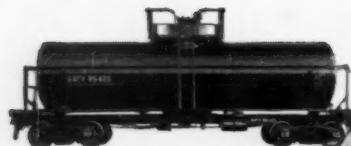
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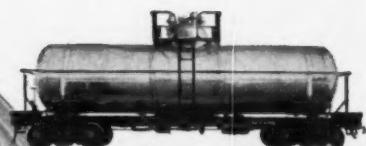
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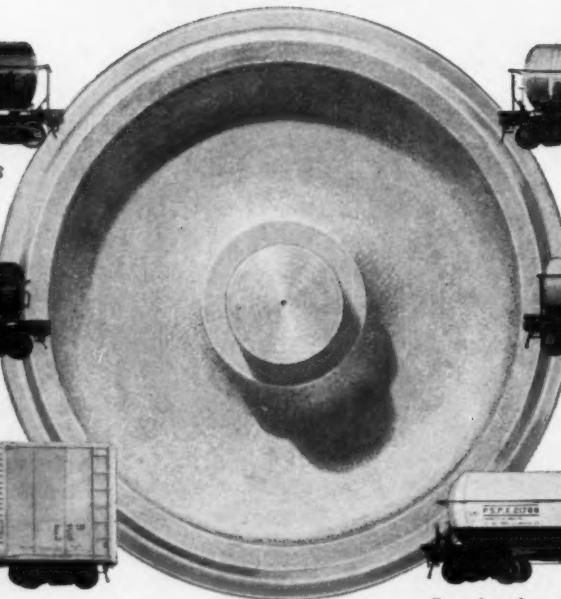
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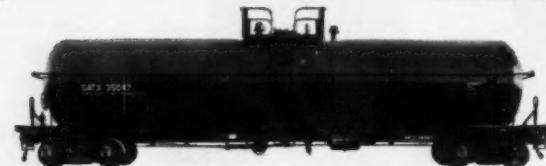
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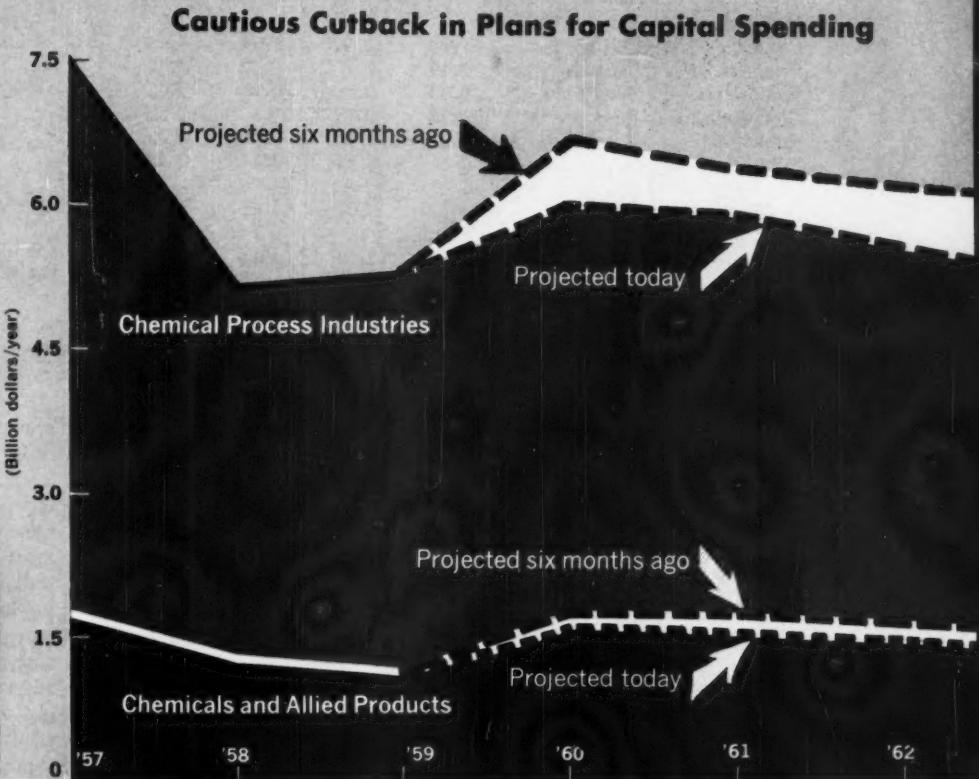


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## Profit Squeeze Clips CPI Spending

CPI companies in the U.S. have tightened up slightly on the capital budgets taking shape for '60 through '62. But they still intend to make these three years very big ones for expansion and modernization—topped only by their epic outlays in '57.

In the chemical process industries as a whole, anticipated '60-'62 capital expenditures were trimmed an average of 7.9% over the past six months (chart, above). During that same March-to-October period, producers of chemicals and allied products pared their plant investment plans an average of 5.3%.

Over-all, according to the McGraw-Hill fall survey of preliminary plans for capital spending, U.S. business is making '60 its second-biggest growth and modernization year, with plant and equipment expenditures now ex-

pected to come within 2.5% of the not-quite-\$37-billion peak recorded in '57. Lesser totals are now computed for '61 and '62, but this is planning that is certain to undergo month-to-month changes.

**Steadier Spending Foreseen:** Major findings in this survey—based on tentative plans drawn up by company managements at the start of the '61 budget-setting sessions—point to considerable stability in general economic conditions:

- Capital spending seems to be taking a steadier course than in some past years (e.g., in '58, when there was a more than 17% drop from the previous year's all-business total).

- Companies in every major manufacturing industry except transportation equipment now expect higher sales in '61 than in '60. A 3% average

increase in physical volume is expected. This can be viewed as a moderate or "normal" gain, contrasted with the more-than-11% jump in dollar volume of manufacturers' sales from '58 to '59.

- U.S. manufacturers were operating at an average of 79% of capacity in September—a significant decline from the average rate of 85% last December and a big drop from the average preferred rate of 94%. The surplus capacity suggests a restraining influence on price changes, with no letup in competitive pressures.

**Stretching Out the Spending:** U.S. business this year is not investing as much money in new producing facilities as had been planned six months earlier (CW, April 30, p. 22). This latest checkup—conducted by Mc-

## CPI Growth Recipe: \$6 Billion/Year

(Projected capital spending, in billion dollars. Source: McGraw-Hill Dept. of Economics)

Industry Group	1959	'60	'61	'62
<b>Chemical process industries:</b>				
Chemicals and allied products	<b>1.24</b>	<b>1.61</b>	<b>1.64</b>	<b>1.59</b>
Products of petroleum and coal	<b>2.49</b>	<b>2.45</b>	<b>2.52</b>	<b>2.50</b>
Pulp, paper and allied products	<b>0.63</b>	<b>0.75</b>	<b>0.69</b>	<b>0.53</b>
Stone, clay and glass products	<b>0.53</b>	<b>0.63</b>	<b>0.56</b>	<b>0.55</b>
Rubber and rubber products	<b>0.19</b>	<b>0.24</b>	<b>0.23</b>	<b>0.20</b>
Nonferrous metals	<b>0.31</b>	<b>0.34</b>	<b>0.34</b>	<b>0.32</b>
<b>CPI totals</b>	<b>5.39</b>	<b>6.02</b>	<b>5.98</b>	<b>5.69</b>
<b>All manufacturing industries:</b>	<b>12.07</b>	<b>14.33</b>	<b>13.93</b>	<b>13.35</b>
Mining	<b>0.99</b>	<b>0.99</b>	<b>0.90</b>	<b>0.89</b>
Transportation and communication	<b>5.61</b>	<b>6.24</b>	<b>5.40</b>	<b>5.01</b>
Electric and gas utilities	<b>5.67</b>	<b>5.89</b>	<b>6.14</b>	<b>6.01</b>
Commercial and financial	<b>8.21</b>	<b>8.61</b>	<b>8.70</b>	<b>8.54</b>
<b>All business</b>	<b>32.55</b>	<b>36.06</b>	<b>35.07</b>	<b>33.80</b>

## Operating Rates: Down from Last December

(as percentage of capacity)

Industry Group	Preferred Rate	Actual Rate Dec '59	Current Rate
Chemicals and allied products	<b>93%</b>	<b>82%</b>	<b>77%</b>
Petroleum refining	<b>97%</b>	<b>86%</b>	<b>83%</b>
Pulp, paper and allied products	<b>100%</b>	<b>91%</b>	<b>90%</b>
Stone, clay and glass products	<b>90%</b>	<b>78%</b>	<b>76%</b>
Rubber and rubber products	<b>96%</b>	<b>84%</b>	<b>85%</b>
Nonferrous metals	<b>96%</b>	<b>77%</b>	<b>75%</b>

## New Year's Sales: More Guarded Optimism

Industry Group	'60 vs. '59 Sales Change Expected Year Ago	Actual Sales Change, 9 months '60 vs. 9 months '59	'61 vs. '60 Sales Change Expected Now	
			'61 vs. '60 Sales Change Expected Now	
Chemicals and allied products	Up 9%	Up 10.4%	Up 3%	
Products of petroleum and coal	Up 3%	Up 2.9%	Up 3%	
Pulp, paper and allied products	Up 6%	Up 4.5%	Up 5%	
Stone, clay and glass products	Up 7%	Up 0.4%	0%	
Rubber and rubber products	Up 7%	Up 1.5%	Up 3%	
Nonferrous metals	Up 7%	Down 2.7%	Up 4%	

McGraw-Hill's Dept. of Economics—reveals that during the spring and summer months, more than \$1 billion has been trimmed from this year's anticipated capital expenditures. For business as a whole, the level of planned expenditures over the next two years is now higher than was indicated by reporting companies last March.

Most major industries—with the exception of utilities and commercial companies—are now planning to

spend less in '61 than in this year. Companies are about equally divided between those planning increases and those planning cutbacks. This holds true for both large and small companies.

**More Prudence:** Manufacturing industries as a whole expect to spend about \$14 billion on new plant and equipment next year—about 3% less than in this year. The current lower level of business activity is causing

management to screen all plant proposals more rigorously; planned outlays for '61 are now slightly less than was indicated earlier this year.

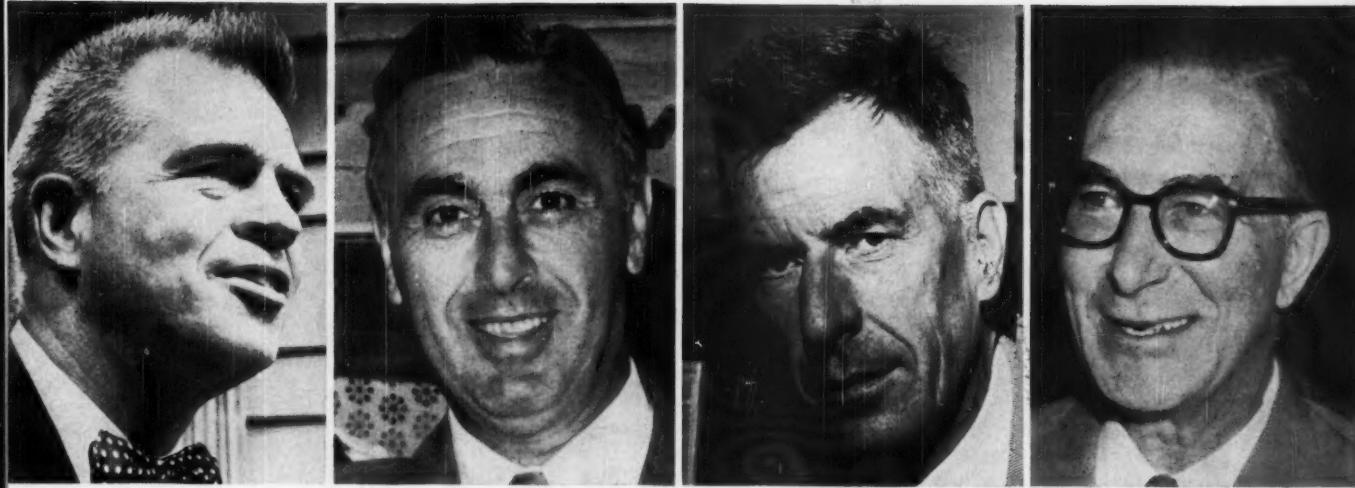
Makers of machinery, autos, pulp and paper, food and beverages, and those industries included in "miscellaneous manufacturing" have raised their sights for '61 since last winter; but all other manufacturing industries now are thinking in more modest terms for the coming year.

In the chemical process industries, petroleum refiners—although operating at a rate well below the preferred level—plan to boost capital spending about 3% next year. The chemical industry, which has spent substantially more than \$1 billion each year since '51, is continuing its long-term growth, with chemical companies already planning to spend in '61 about 2% more than in this year. The chemical industry—one of the biggest spenders on research and development—will emphasize both modernization and capacity to produce new products. Among the other process industries, three segments—stone, clay and glass products; pulp and paper; and rubber producers—are all operating at considerably below preferred rates. They now expect to taper off on capital spending next year.

**Subdued Sales:** Unlike last year, when manufacturers told McGraw-Hill they were expecting sales to rise an average of 9% in '60, companies this year say they are looking for only a 3% average sales increase in '61. Most optimistic are the machinery and pulp and paper producers, forecasting 5% gains for themselves next year.

The survey is termed "a report of what companies now plan to spend," not a forecast. Actual outlays will depend on the general economy and on government policy (see p. 23). Already, some companies may be revising these spending plans on the strength of what Wall Street now calls "the Kennedy bull market."

The significance of the survey's findings? According to the economists, the high level of investment now planned in this period of declining profit margins shows that companies hoping to prosper in the intensive competition ahead are betting on modernization to reduce costs and on adding capacity to produce new and more profitable products.



WIDE WORLD

Williams, Ribicoff, Galbraith, Kefauver: Among those likely to be VIPs in Kennedy's Washington.

## CPI Wonders: Kennedy and Who Else?

The names of the men pictured above figure prominently in post-election Washington's most popular parlor game: guessing the likely make-up of the new Democratic Administration's top echelon. Since the new Administration has shown evidence of a keen interest in several issues of CPI concern, chemical management men have more than a casual stake in this kind of political "pin-the-tail-on-the-donkey."

Water- and air-pollution measures will get favorable attention. A bill increasing grants for sewage-treatment plants from \$50 million to \$90 million/year was vetoed by President Eisenhower; President-elect Kennedy has said he would sign such a measure. Research funds for air pollution will get more support from a Democratic Administration.

During the campaign Kennedy cited the importance of saline-water research to assure that this country gets credit for the first breakthrough. This, he said, would raise U.S. prestige with underdeveloped countries more than sputniks and superbombs.

**Wage Move Expected:** Minimum wage legislation also stands a fair chance. Kennedy is anxious to redeem his Senate bill, which the House watered down. This measure would raise minimums to \$1.25 and extend coverage to some 4 million workers, mainly in the retail field. Most chemical companies—which already pay

more than the minimum—would not be directly affected.

Taking some of the steam out of Kennedy's march toward a "New Frontier": a Congress dominated even more than the last one by the relatively conservative coalition of Southern Democrats and Midwest Republicans.

The President-elect has moved swiftly toward some changes in the much-criticized regulatory agencies. From Hyannis Port he named James M. Landis, former Harvard Law School dean and former chairman of the Civil Aeronautics Board, to draw up recommendations for changes. A probable priority problem: ways to overcome the "regulatory lag" that keeps decisions of momentous importance to industry hanging in the balance for months or even years.

**Cabinet Keys:** All told, Kennedy has some 600 top political jobs to fill and the tone of the new Administration is likely to be revealed by Kennedy's key appointments. Of particular interest to the chemical industries are these: Secretary of Health, Education and Welfare, Secretary of Commerce, and Secretary of the Treasury.

Gov. G. Mennen Williams of Michigan, who declined to run again after six terms, is the most likely bet for HEW. He has had long interest in welfare problems and was helpful to Kennedy in carrying Michigan. Gov.

Abraham Ribicoff of Connecticut—one of Kennedy's earliest and staunchest supporters—is a likely bet for Attorney General.

Gov. Luther Hodges of North Carolina, who headed the Businessmen-for-Kennedy organization, has already been named as the next Secretary of Commerce. His big role in the campaign was to convince businessmen that Kennedy is not a wild-eyed radical on fiscal matters.

Two men mentioned for Treasury are Eugene Black, president of the World Bank, and John McCloy, chairman of Chase Manhattan Bank. And Prof. John Kenneth Galbraith of Harvard—author of "The Affluent Society"—is expected to continue as a close economic advisor to Kennedy. On all major appointments, however, Kennedy is keeping his own counsel.

Each department has some 10 to 20 jobs that will change hands immediately. These posts range down to the Assistant Secretary level and include a number of personal assistant posts of a policy-making nature. Most agency heads, such as the Food and Drug commissioner or the Public Health Service chief, are career civil service men and will not be replaced.

**On the Hill:** One of the most important men in the new picture, House Speaker Sam Rayburn, spoke up promptly on the need to push legislation on medical care, minimum wage, and other Democratic platform

measures. How vigorously "Mister Sam" puts his powerful influence and long experience behind Kennedy's liberal program will largely determine its success. He could provide significant help with Kennedy's initial problem: how to curb the powers of the House Rules Committee.

Sen. Mike Mansfield of Montana is mentioned as the most likely successor to Lyndon Johnson as majority leader. He would be personally sympathetic to most of Kennedy's program and is highly respected by his colleagues. In addition, "The Old Pro" Lyndon Johnson, as Vice-President, will be presiding officer of the Senate and can be a valuable troubleshooter for Kennedy with the reluctant Southern conservatives. And New Deal-type bills will get support from Sen. Estes Kefauver of Tennessee, chairman of the Senate's Antitrust

Subcommittee, who was overwhelmingly re-elected.

In general, legislation aimed at strengthening the military forces can be expected to draw good support in Congress; likewise, development of water, power and natural resources—measures of deep interest to congressmen from Western states. Measures to spur scientific development, such as research on saline water, would stand a good chance with strong Presidential backing, even though they involve more spending.

At any rate, the exciting "First Hundred Days" Kennedy called for in the campaign will bear little resemblance to Roosevelt's Hundred Days, in which the whole New Deal was shaped. The young President-elect will have to accommodate himself to a Congress that does not appear to be in the mood for wholesale changes.



**UOP'S Venema:** New growth plan may include petrochemicals venture.

## Bigger Base for UOP

Universal Oil Products—which up to this year largely confined its operations to research and development, engineering and construction, and licensing—is now moving fast to build up a fourth business base: manufacturing.

- Last week the company bolstered its catalyst production program by acquiring Catalytic Combustion Corp. (Detroit).

- UOP is installing "additional and more efficient production facilities" for the broad range of specialty organic chemicals turned out by its 51%-owned Trubek Laboratories—which is to be 100%-UOP-owned in less than two years (*CW, April 9, p. 24*).

- And of more immediate interest, the company is seriously considering taking a plunge into petrochemical production.

Moving into manufacturing—which might put UOP in competition against some of its process licensing and construction clients and catalyst customers—could make this company a major chemical producer in a relatively short time, considering the company's know-how in petrochemical technology.

"Universal intends to exploit its developments in this area to maximum financial advantage," company President Maynard Venema told a group of financial analysts meeting in New York last week. "In particular, the possibility of manufacturing cer-

## What to Expect from Kennedy on . . .

### AIR POLLUTION:

Probably more funds for research, more federal enforcement authority.

### ANTIRECESSION:

If recession develops, loosening of credit, housing measures, other pump-priming gestures.

### ANTITRUST:

Continued vigorous enforcement, more support for such measures as premerger notification.

### DEPRESSED AREAS: DRUG REGULATION:

Fulfillment of pledges of federal aid. Support for Kefauver proposals tightening FDA regulation of industry.

### FOREIGN TRADE:

Continuation of free-trade policies but with compensation to injured industries; possible regional instead of multilateral negotiations.

### MINERALS:

Subsidy of small producers, research on usage.

### MINIMUM WAGE:

An immediate push for Kennedy's own bill (defeated this year) raising minimum to \$1.25 and broadly extending coverage.

### SALINE WATER:

Increased government support seeking to give U.S. a breakthrough.

### TAX REFORM:

Administration support for overhaul of depreciation allowances, closing of loopholes and other tax revisions.

### WATER DEVELOPMENT:

Reversal of "no new starts" policy, backing for public power-water conservation projects.

### WATER POLLUTION:

Support of increased grants for sewage-treatment plants.

tain petrochemicals is being actively explored, either alone or in a joint venture."

He added that UOP's cash flow appears to be adequate for present capital needs, but that "our acquisition activities and our increased manufacturing operations could very well require new equity financing in the future, depending on the magnitude of the transaction involved."

At the same time, UOP expects its licensing and engineering activities to benefit from the continuing growth of the petrochemical industry, both in the U.S. and elsewhere.

The company's new *p*-nitroaniline plant at Shreveport, La., will soon be onstream, providing a captive source for this catalyst ingredient. Sale of by-products from this plant, Venema says, "will accelerate Universal's entry into the field of industrial organic intermediates." Also under construction: plants for production of nonyl phenols, other alkyl aromatics, and alkylated amines.

### More Monsanto Plants

**Monsanto Chemical** last week spelled out the second phase of its potentially big development plan for its 650-acre tract along the Delaware River near Gibbstown, N.J.

Next to the phthalic anhydride plant that's been designated as the first major facility for this site (*CW*, Sept. 10, p. 32), Monsanto will put up one unit to produce its plasticizer Santizer 160 and another to turn out up to 20 million lbs./year of benzyl chloride. Groundbreaking will take place late this week and all three units are expected to be in operation by early '62.

Meanwhile, Monsanto is doing preliminary work for a possibly large-scale petrochemical project on the Texas Gulf Coast (*CW Business Newsletter*, Nov. 12).

And the company has found a new outlet for nitrogen products. Chromalloy Corp. (St. Louis) revealed last week that Monsanto's Lion Oil is now supplying it with ammonium nitrate in connection with its new explosives program. Chromalloy foresees an immediate market of 30,000-40,000 tons/year for its new nitro-carbonate blasting agent next year—or about 10% of the ammonium nitrate blasting market.



**Dow's H. Doan and Gerstacker: Moving up into the top triumvirate.**

## Youth Moves Up at Midland

Dow Chemical's biggest managerial changeover since '49 came suddenly last week, four days after the death of Executive Vice-President Mark Edson Putnam (*CW Business Newsletter*, Nov. 12).

Chairman of the Board Earl W. Bennett is going into retirement but employee, officer and director—created a second top vacancy by resigning from the chairmanship. At 80, Bennett is going into retirement but will continue to serve as a member of the board of directors and finance committee.

To fill the two lofty offices, the board moved up two of its youngest members:

- Carl Allan Gerstacker, 44-year-old chemical engineer who learned about corporate finance from Bennett and had been treasurer for the past decade, was elected chairman. He will continue as chairman of the finance committee.

- Herbert Dow Doan, 38, also a chemical engineer, was promoted from manager of the Chemicals Dept. to executive vice-president. He is a son of company President Leland I. Doan and a grandson of company founder Herbert Henry Dow.

Gerstacker, like Bennett, has been one of the chemical industry's few high-ranking executives favoring considerable use of borrowed capital for speeding up expansion. His policy: use debt as needed, but hold it down so that total fixed charge, plus cash

dividends, are fully covered by depreciation set-asides alone. Two years ago, Dow's long-term indebtedness hit \$275 million; now it's down to half that figure.

And on the same day that he was chosen for the Dow chairmanship, Gerstacker was nominated for next year's presidency of the Synthetic Organic Chemical Manufacturers Assn.

Succeeding Herbert Doan as manager of the Chemicals Dept. is John M. Henske, for the past year manager of product services at Midland, Mich.

President Leland Doan will remain as chief executive officer and chairman of the executive committee.

With these younger men taking over from two old-timers, the chemical industry will be watching to see whether Dow will draw up a managerial organization chart—a tactic specifically banned by both Herbert Dow and Willard Dow, who consecutively headed the company from 1897 to '49; and whether Dow will continue to borrow to spur growth.

On his first day as chairman, Gerstacker hinted that a more gradual growth program is now preferred. Asked about Dow's drive to boost sales to the \$1-billion mark (*CW Business Newsletter*, Sept. 20, '58), Gerstacker replied:

"We will not make \$1 billion in sales in fiscal '61 or calendar '61, but we're still working hard on that target, and I don't think it will be too long before we reach it."

# rapid roundup

Rounding out the week's news of companies, expansions, and foreign developments.

## companies

**Stauffer-Temescal Co.** (Richmond, Calif.), wholly owned subsidiary of Stauffer Chemical Co., has been renamed the Stauffer Metals Co. and on Jan. 1 will become a division of the parent firm. Stauffer Chemical bought out the Temescal Metallurgical interest in the joint company last spring (CW, May 28, p. 28) and is boosting the R&D staff of this division. All activities relating to metals will be transferred to the new unit.

**E-Z-Flo Chemical Co.** (Lansing, Mich.), a division of Consolidated Industrial & Agricultural Chemicals, Inc., has purchased the agricultural chemical subsidiary of Inland Chemical Corp. (Ft. Wayne, Ind.). A new warehouse and office are going up in Plymouth, Ind., to be the headquarters of the E-Z-Flo acquisition.

**United Pacific Aluminum Corp.** (Los Angeles) has signed a 20-year power contract with the Bonneville Power Administration for electricity for United's proposed potline aluminum reduction plant near Longview, Wash. (CW Business Newsletter, June 25, p. 18). This contract is one of four new allocations of Columbia River power for new plants in the Pacific Northwest. Others signed: Harvey Aluminum, Inc. (aluminum reduction unit), Webb & Knapp Co., Inc. (steel plant), Crown Zellerbach Corp. (expansion of pulp mill).

**Reynolds Metals Co.** and Tilo Roofing Co. (Stratford, Conn.) are winding up negotiations for merger of the two firms. Subject to approval by the boards of directors and stockholders of each company, the merger would exchange one share of Reynolds second preferred stock for 5 3/4 shares of Tilo common stock. Tilo manufactures and distributes asbestos and asphalt building products.

## expansion

**Naphthalene:** Tidewater Oil Co. has named Catalytic Construction Co. (Philadelphia) as contractor for the new petroleum naphthalene plant (a joint venture of Tidewater and Collier Carbon and Chemical) at Tidewater's Delaware refinery. Scheduled to be onstream by the end of '61, the plant is part of what Tidewater President George Getty describes as "a vigorous move into the petrochemical field."

**Phenol:** Dow Chemical Co. has awarded a contract for construction of its 36-million-lbs./year phenol plant at Kalama, Wash. (CW, March 26, p. 109), to Hoffman Construction Co. (Portland, Ore.). Construction will begin about the first of the year and the plant is due onstream in mid-'62.

**Particle Board:** American Parboard Co. (Swannanoa, N.C.), a division of National Starch and Chemical Co., has purchased a 10-acre tract near Swannanoa to expand its flakeboard and particleboard operations. A warehouse is already under construction on the property.

**Corrugated Paper:** Georgia-Pacific Corp. (Portland, Ore.) has started construction of a \$1.5-million corrugated paper plant at Olympia, Wash. The plant, set for completion in March '61, will turn out 25 million sq.ft./month of finished corrugated paper and will make corrugated boxes and special containers.

## foreign

**Wax/Germany:** Farbwerke Hoechst (Frankfurt, Germany) will invest \$1 million to expand wax production at its Gersthofen plant near Munich. Principal markets in the U.S. for Hoechst wax are in self-polishing emulsions and carbon paper.

**Pharmaceuticals/Vietnam:** Germany's Bayer and Australia's Nicholas Proprietary Ltd. have licensed pharmaceutical plants in Saigon, Vietnam. Their action is in response to a government ban on the import of tablets, pills and syrups that can be manufactured locally from imported chemicals. Of the 50 drug manufacturing houses in Vietnam, 15 prepare proprietary drugs under licensing agreements from European and U.S. companies.

**Rubber/India:** National Rubber Manufacturers Ltd. (Calcutta, India) has another entry in India's growing tire industry. National Rubber is sponsoring a new \$4.2-million company, General Tyres Ltd., to manufacture automotive tires and tubes in collaboration with Technoexport (Prague, Czechoslovakia). Already in the race are two U.S. producers, Mansfield Tire & Rubber and Firestone.

**Petrochemicals/Ireland:** Britain's Imperial Chemical Industries Ltd. will begin development early next year of a polyester plant on 200 acres at Kilroot, Ireland. Onstream date: '63. Other fibers may come out of this venture, including polypropylene. Planned for the same area in Northern Ireland is the country's first oil refinery, to be put up by British Petroleum, Ltd.



New high bridge, wider harbor mouth will eliminate Corpus Christi's shipping bottleneck.

## Corpus Christi: New Petrochemical Frontier

Planned for early '61 in Corpus Christi, Tex.: a broad-based promotional campaign by the Chamber of Commerce designed to attract new industry to the area. Based on a probing, \$25,000 economic and industrial survey by the University of Texas, the campaign will be tuned closely to chemical process industries: the port city lies at a crossroads of gas-processing industry, oil and gas pipelines.

Less well known than its neighbors "back east" along the Gulf Coast — Houston, Texas City, Freeport, Lake Charles—Corpus Christi is on Corpus Christi Bay, a beautiful, protected inlet of the Gulf of Mexico, discovered by Spanish conquistadores some 440 years ago. It lies 225 miles southwest of Houston and 150 miles north of the Mexican border.

**Industry:** Chemical stakes in Cor-

pus Christi were put down as early as '34, when Columbia-Southern Chemical Corp. located a soda ash plant there, the earliest major chemical plant built anywhere in the Southwest. Today, in the immediate Corpus Christi area comprising Nueces and San Patricio counties, \$600 million worth of CPI plants have been built.

While about half of that is in petrochemical and petroleum processing facilities, the other half is in inorganic chemicals or primary metals production facilities.

It's this diversified balance that local businessmen hope will give Corpus Christi a touchstone to new industries. For example, a detailed study made a year ago showed that Corpus Christi has the factors necessary for a direct-reduction sponge iron plant (using ore from Venezuela).

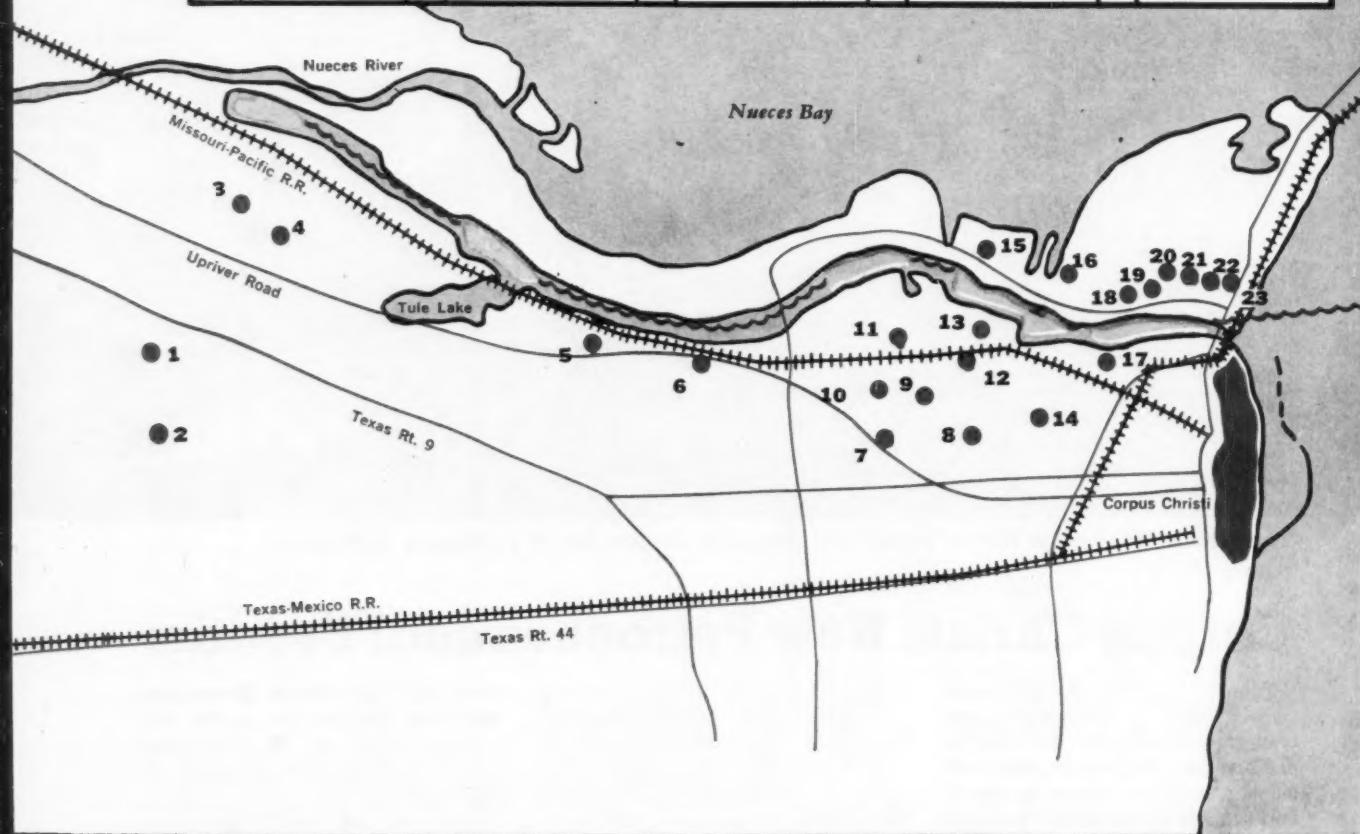
And the University of Texas study concludes that the city is the only refining center on the Gulf Coast that is likely to show continued refinery growth.

One of the area's newcomers Suntide Refining Co., has indicated that it will concentrate much of its activity in petrochemical production. Originally built as a 25,000-bbls./day refinery in '53, Suntide now processes 65,000 bbls./day, and turns out 2,200 bbls./day of benzene, toluene, and xylenes, 300 tons/day of coke, as well as motor fuels, tetramer, aviation alkylate and jet fuels. The company plans to build a 60-million-lbs./year styrene unit, which it will expand to 75 million; it also plans to increase production of benzene.

Suntide is a subsidiary of Sunray-

## Corpus Christi CPI clusters around water, raw materials

LEGEND	1	Celanese Corp. Clarkwood Research Center	8	Pontiac Refining Co.	15	National Lead Co.	22	Sinclair Refining Co.
● Plants and Terminals	2	Southern Minerals Corp.	9	Delhi-Taylor Oil	16	Halliburton Portland Cement Co.	23	Conoco
Railroads	3	Suntide Refining Co.	10	Suntide Refining Co.	17	Magnolia Petroleum Co.	24	Reynolds Metals Co.
Turning Basins	4	Humble Pipeline Co.	11	Sinclair Refining Co.	18	Texas Pipeline Co.	25	Humble Pipeline Co.
Towns and Cities	5	Corn Products Refining Co.	12	Great Southern Chemical Corp.	19	Republic Pipeline Co.	26	United Carbon Co. Kosmos plant
~~~~ Deepwater Channels	6	American Smelting and Refining Co.	13	Columbia-Southern Chemical Corp.	20	Texaco, Inc.	27	Geode Petroleum Co.
— Main Highways	7	Southern Minerals Corp.	14	Southwestern Oil & Refining Co.	21	Celanese Corp.	28	Sun Pipeline Co.



Mid Continent Oil Co., which recently announced formation of Sunray Chemical Co. to make chemicals and petrochemicals. There's speculation that Sunray might locate at Corpus Christi near Suntide.

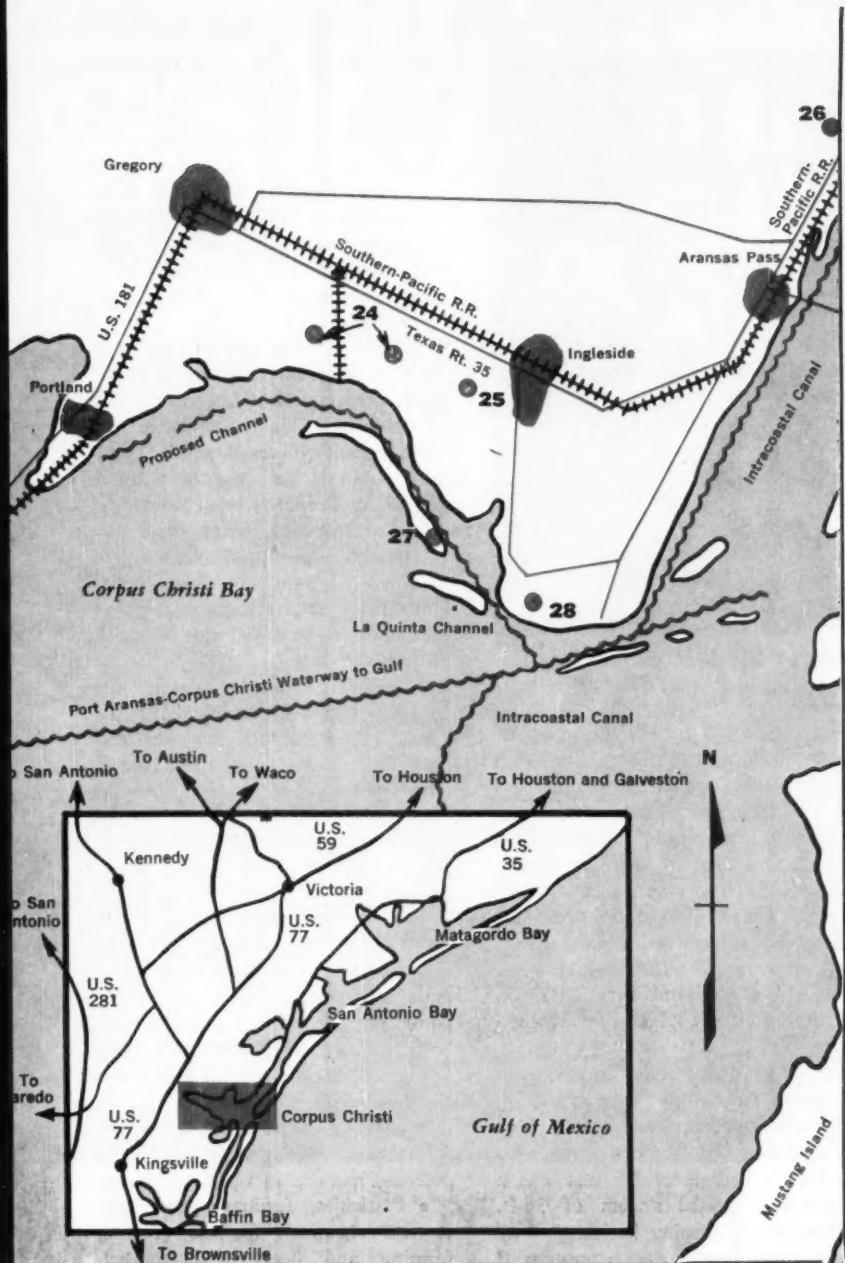
Another independent refining company — Delhi-Taylor Oil Corp. — is also actively moving into petrochemicals. Currently producing about 2,000 bbls./day of benzene, the company recently put onstream a 70-million-lbs./year orthoxylene unit. Its Corpus Christi refinery can process 40,000 bbls./day of crude oil, and

among its products are furnace carbon black feedstock oil, motor fuels, LPG, toluene, mixed xylenes and solvents. Delhi-Taylor is also preparing to study the feasibility of making pure meta-xylene.

Other refineries in Corpus Christi and their daily crude oil capacity are: Pontiac Refining Corp., 50,000 bbls./day; Southwestern Oil & Refining Co., 30,000 bbls./day; Sinclair Refining Co., 29,000 bbls./day; Howell Refining, 6,000 bbls./day.

**Oil, Gas Nexus:** Over 20,000 gas and oil wells lie within 150 miles of

Corpus Christi. It has two crude oil pipelines from west Texas — Humble Oil's at 50,000-bbls./day capacity, and Atlantic Refining's at 45,000 bbls./day — terminating there; and it sits atop 16% of the country's natural gas reserves and about 8% of its oil reserves. As a result it's not surprising to see 28 natural gas processing plants in the Coastal Bend area, in addition to the refineries. Oil production in the area was over 110 million bbls. last year and over 1.5 trillion cu.ft. of natural gas was produced.



Right now a lot of interest centers on Humble Oil's King Ranch gas plant, which went onstream in September, about 55 miles from Corpus Christi. It has a daily capacity of 800 million cu. ft. of gas and 28,000 bbls. of natural gas liquids. Union Carbide will take all the lower hydrocarbons, about half the total plant volume and use them as petrochemical feedstocks at its Brownsville and Seadrift plants. Delhi-Taylor, on the other hand, will process the isobutanes and heavier stocks at Corpus Christi.

While there are no known definite

plans for olefin production in Corpus Christi, local observers think that with the tremendous amounts of feedstocks available now, this would be a strong possibility. They think it would be just the catalyst to give the city the boost it needs to really challenge Gulf Coast CPI complexes.

The first aromatics plant in Corpus Christi was built by Great Southern Chemical Corp. whose feedstocks come from refineries and gas cycling plants via Pontiac Refining. Great Southern makes 600 bbls./day of benzene, 900 bbls./day of toluene

and 250 bbls./day of xylenes.

**Other CPI:** In other phases of chemical operations, Columbia-Southern Chemical Corp. uses salt from a dome 60 miles from the city, oyster shell from Nueces Bay and Texas limestone to make 700 tons/day of soda ash, 200 tons/day of chlorine and 220 tons/day of caustic soda. It also makes some liquid and solid carbon dioxide, as well as caustic potash and some oil-drilling mud additives. The company is planning a multi-million-dollar chrome chemicals plant at its present facilities.

Another user of the virtually unlimited quantities of oyster shell near Corpus Christi is Halliburton Portland Cement Co., operating a 1.4-million-bbls./year cement plant. Corn Products Co. processes grain sorghum at Corpus Christi to make vegetable oil, starches, animal feed components, molasses, dextrose sugars and soft-drink coloring.

American Smelting and Refining Co. electrolytically refines zinc and cadmium from ores from Mexico, Peru and the western U.S. and also produces by-product sulfuric acid. Another mineral processed in Corpus Christi is barytes, which Baroid Division of National Lead Co. uses to make its oil-well drilling muds.

The newest and largest single major industry in the area is the installation of Reynolds Metals Co. Across the bay from Corpus Christi at Gregory (see map), Reynolds has invested a total of nearly \$175 million in an alumina plant and in an aluminum-smelting plant. Bauxite is shipped in to the 730,000-tons/year plant from Jamaica and Haiti by barge or deep-water freighter.

**Organic Starter:** Second largest CPI installation in the region is Celanese Chemical Co.'s Chemcel plant at Bishop, 40 miles southwest of Corpus Christi, where the company makes a number of synthetic organic chemicals—some 50 different products each year. Major ones include acetaldehyde and paraformaldehyde, butanols, acetates and glycols; the company is building a 1,3 butylene glycol plant. In Corpus Christi itself, Celanese maintains headquarters for its manufacturing department and its data-processing center at the Corpus Christi plant.

Other CPI plants in the Corpus Christi area are: United Carbon Co.'s



Main turning basin makes harbor one of Southwest's finest.

carbon black (furnace and channel) plant at Aransas Pass; Briner Paint Mfg. Co., South Texas Cotton Oil Co., Air Reduction Sales Co.'s oxygen and industrial gases plant.

In addition to plants, there are two large research and development labs in Corpus Christi. Celanese Chemical's main research and development center is at Clarkwood, eight miles west of Corpus Christi. Columbia-Southern has 125 people in its research and development laboratory, located adjacent to its Corpus Christi plant.

**Growth Factors:** A number of key factors, say economists, have made Corpus Christi a likely growth area. Mainly they are plentiful supplies of land, labor and raw materials at economic prices. Coupled with these is a sympathetic attitude toward industry, indicated by the fact that the city's mayor is Ellroy King, president of Halliburton Portland Cement Co. Moreover, the board of trade of the Port of Corpus Christi is made up of plant managers and top executives of all major industries in the city, including all the CPI companies. There have been no annexations by the city—most plants are outside the city limits—since '54, unlike the situation in other Texas communities.

Water, too, is a prime factor influencing the city's present and future well-being. Mayor King comments

that "industry follows the dredges" and this has proved to be so at Corpus Christi. First opened in '26, the port now is the third largest in total tonnage in Texas and ninth in the nation, handling a total of over 24 million tons in '59. The port director's comment: "Corpus Christi is two-thirds closer to two-thirds of Texas than any other port." The Nueces River water itself contains very little silt, making it especially good for processing.

A continuing port improvement program is winding up now. It includes construction of a new high bridge over the harbor entrance to replace a bascule bridge that was a bottleneck to the system of 36-ft. channels and turning basins.

A major feature of the upsurge of Corpus Christi development is its water conservation program. Until '58 one of its biggest problems was water scarcity. But a new dam—the Wesley Seale Dam on the Nueces River, 35 miles from the city—now holds 300,000 acre-ft. and has increased the city's potential supply from 47 to 117 million gal./day.

**Siteland:** A valuable by-product of channel construction is the new land being built up by dredging operations on either side of the channel. It's dedicated to industrial site usage.

There are over 15,000 acres of industrial sites in the Corpus Christi

area on or near deep water, available at prices of \$1,000-4,000/acre. A number of plants have large tracts available for future expansion.

Celanese, for example, has 1,400 acres, and Reynolds has 2,000 acres. Approximately 7,300 acres are open on a deepwater ship channel near Reynolds, including individual sites as large as 3,000 acres, much of it owned privately.

Additional sites are obtainable a mile or so from the ship channel, and approximately 10,000 acres could be made available to barges on the north side of Nueces Bay.

In addition to deepwater transportation, Corpus Christi is served by three railroads, barge companies on the Intracoastal Waterway, and excellent highway and expressway systems. There are three colleges in the immediate area and a plenitude of recreational facilities.

Major labor union in the area is the Oil, Chemical & Atomic Workers, which is most active in the refineries. Several plants are unorganized; others have independent unions. Average wage rate for common labor in the chemical industry is \$2; top operators get \$2.80 to \$3.10; first-class maintenance men, \$2.95 to \$3.20.

**Market Possibilities:** Talks with CPI management already in the area indicate that future industrial development might well include plants for petrochemicals, chlorinated hydrocarbons, primary metals, fertilizers and fabricated or further processed derivatives of these products.

Insiders in the area cite a number of chemical investments as having potential markets in Corpus Christi:

- Pesticides, fertilizers and agricultural chemicals for the growing farming and beef cattle market. There's talk of building a beef-finishing operation in the area.

- Polypropylene to cash in on liquid petroleum gases that refineries can crack to propylene; vinyl resins for coatings, aluminum casting or extrusion, and polystyrene to use locally produced styrene.

- Glass, ceramics, brick and pottery are looked-for outgrowths of local clays and sands.

- Growth as a vacation area now could increase demand for a number of consumer products, including suntan lotions, fishing apparatus, and other recreation-based products.

**Multiwall Bags by International Paper**



*Multiwall bag undergoes drop test at new Camden lab.*

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Noel M. Champion (left), Chief Engineer, Armour Agricultural Chemical Company, discusses a technical problem with Robert L. Kietzman, Sales Engineer, The Cooper-Bessemer Corporation, St. Louis District Office.

## How Cooper-Bessemer service helps keep the ammonia flowing

At Armour Agricultural Chemical Co., Crystal City, Missouri, nine Cooper-Bessemer compressors play key roles in the manufacture of ammonia products. Round the clock, for five years, these units have given exceptional performance under the rigors of such problems as handling pressures up to 9000 psi.

The performance of these C-B compressors has been backed by Cooper-Bessemer engineers in the St. Louis area and in Mt. Vernon, contributing helpful service for these high-pressure operations.

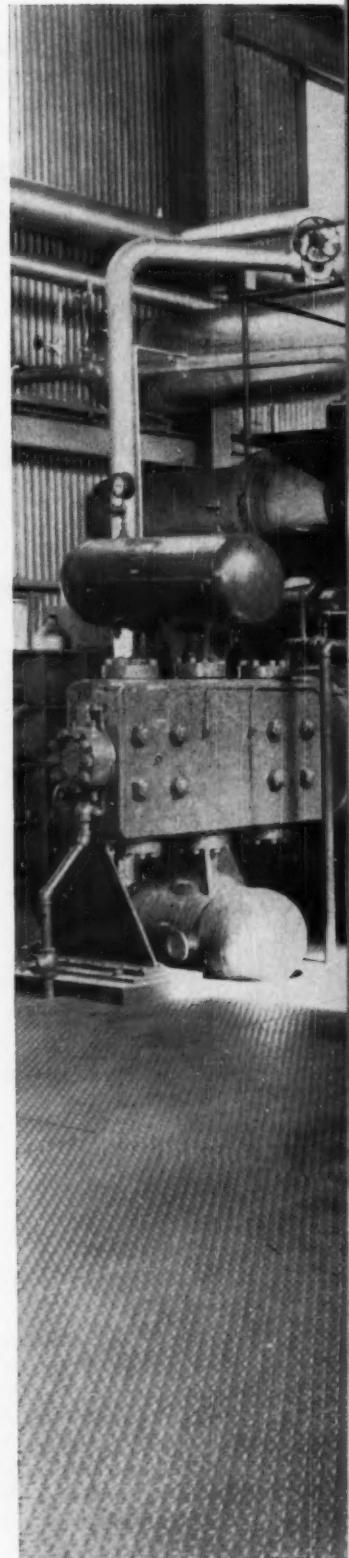
Cooper-Bessemer engineers will gladly help you plan compression facilities, and demonstrate how this unique service works for your benefit. Call the nearest office.

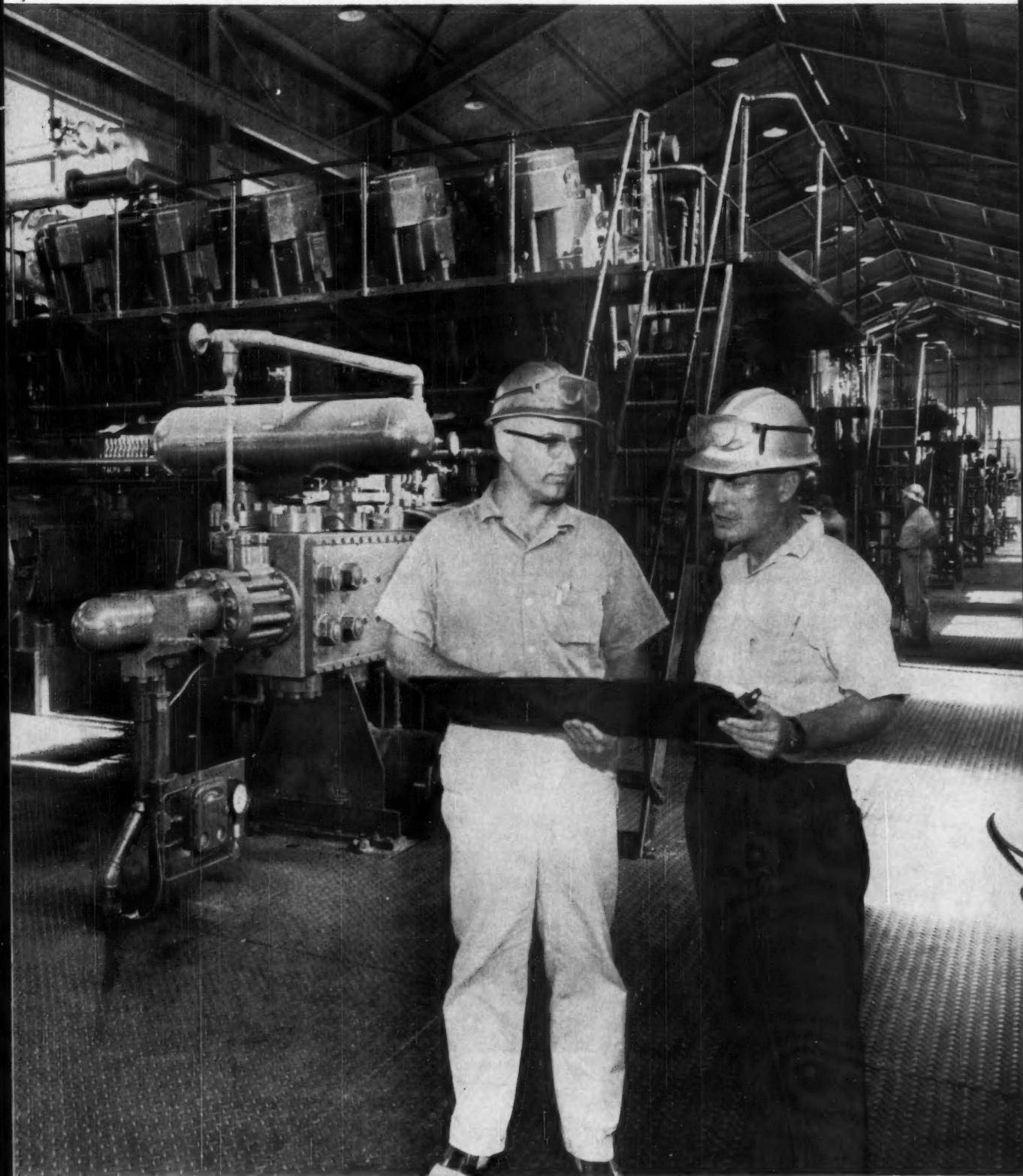
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Noel M. Champion (left) and Thomas H. Ferebee, Supt. Ammonia Plant. In background are two GMWA-10, four GMWA-8 and one GMWA-6 engine driven compressors for compression of air, natural gas, synthesis gas and ammonia. Armour also has two FM compressors for ammonia recirculators.

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POTASSIUM PHOSPHATES	Dipotassium Phosphate	Potassium Tripolyphosphate
Monopotassium Phosphate	Tripotassium Phosphate	Tetrapotassium Pyrophosphate

**CDB**

**CDB-59**

Potassium Dichloroisocyanurate

**CDB-60**

Sodium Dichloroisocyanurate

**CDB-70**

Dichloroisocyanuric Acid

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**Key to new sugar process, this diffuser allows 20% investment cut.**

## Sugar Cost-Shrinker

The Hawaii Sugar Technologists Assn. convened recently in Honolulu, heard favorable news of a process that uses hot water to extract sugar from chopped cane. Over 23,000 tons of sugar have been made in test runs.

Compared with the conventional pressing system, the new technique costs less to install and extracts more

sugar. Moreover, it can produce a waste fiber useful as fuel.

The advantages of the new technique—technically a diffusion process—are backed by equipment manufacturers. They are making firm offers to provide equipment for the new process at \$400/daily ton of cane capacity (conventional milling plants cost

about \$500/daily ton). Little wonder trade experts see the new technique as a major evolutionary step in sugar processing.

The new process will have a heavy impact in a major industry. U.S. consumption of cane sugar is about 7.2 million tons/year, requires processing of almost 80 million tons of cane. Hawaii alone, where sugar is the biggest industry, produces about 1 million tons/year of refined sugar from cane ground in 27 separate mills.

Investment in the plants in the various areas that supply the U.S. is about \$260 million. To meet the needs of our expanding population alone an assured expansion of almost \$5 million/year will have to be invested in new mills.

It is in the building of these new plants that the new diffusion process is expected to get its first trial. Although it saves 25% on investment and boosts sugar extraction efficiency 4%, to 98%, mill operators will not necessarily find it profitable to scrap existing plants and build the new diffusers. The existing mills have lifetimes of over 10 years; their rate of replacement will be slow.

**Piloting Out the Problems:** The Hawaiian process isn't the only diffuser process challenging the crusher-rollers of the conventional cane mills. Another diffuser, developed by Chemetron Corp., has been piloted at the Fellsmere Sugar Producers Assn. (Fellsmere, Fla.). And the Fellsmere-tried process reportedly will be used in a 400-tons/day sugar mill going up in Trinidad. Like the Hawaiian diffuser, this unit is reported to cut investment costs by 25% and extraction costs by 10%, while boosting extraction efficiency to 98%.

Since sugar cane milling involves bulk-handling equipment that can hardly be prorated by calculations from laboratory to full plant scale, both these diffuser processes have been developed in pilot plants. And since the pilot units must wait for the yearly harvest, both processes have been slow in reaching commercial status. Work on the Fellsmere process began in 1955, while the Hawaiian growers started on their unit in 1959.

**Key—Chopped Cane:** Key to both processes is a shredded cane that will allow the diffuser, heart of the proc-

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## ENGINEERING

ess, to wash out the juice with a minimum of water. This contrasts with conventional mills, where chopped cane is crushed in rollers under about 550 tons of pressure. The juices are squeezed out and run off through grooves in the rollers. By comparison, the Fellsmere process makes a slurry of the shredded cane and pumps it to a vertical, counter-current diffusion tower, where water at 190-210 F washes down through the shreds as the shredded cane is carried up.

**Solids Handling:** While this system moves the cane as a slurry, the Hawaiian process employs a continuous solids-handling route:

Sugar cane trucked in from the plantations is loaded onto a conveyor belt, which delivers it to a "pre-breaker" designed by the Reitz Manufacturing Co. (Santa Rosa, Calif.). This equipment, which performs the bulk of the preparation, operates like a giant meat-grinder, chewing the cane into shreds about 4 in. long. (The grinder is powerful enough to pulverize the rocks that accidentally come in from the fields. The unit also once sheared a steel rail without being damaged.) The only difficulty found so far in this process step has been the tendency of the cane to bridge across the feed chute.

Leaving the prebreaker, chopped cane passes, via conveyor belt, over a weighing machine, which controls flow, to a "disintegrator," also manufactured by Reitz. This machine is a swing-hammer mill. It, along with the prebreaker, shows a vital effect on the extraction efficiency. For 98% extraction, 94% of the cane cells must be ruptured.

From the disintegrator, shredded cane drops down directly into the heart of the process, the "diffuser," which is manufactured by Silver Engineering Works (Denver, Colo.). This equipment is essentially a long trough tilted down toward the feed end at an angle of 24 degrees. Two large scrolls with their spirals intermeshed carry the shredded fibers through the trough, while a descending stream of water several feet deep washes the juice toward the low end.

The scrolls rotate at about one revolution per minute, giving the shreds a theoretical speed of about 5-6 ft./minute; tests showed actual speeds to be 1-4 ft./minute. Holdup was 36-50 minutes. Extraction water tem-

peratures were held at about 160 F to keep down microorganism activity and chemical inversion, since tests showed the water temperature had little effect on extraction efficiency.

Discharge scrolls, at the high end of the diffuser at right angles to the transfer scrolls, push the washed shreds into a screw press designed by the French Oil Mill Machinery Co. (Piqua, O.). This presses the shreds into a be-gasse containing 45-50% water. Additional juice is returned from the press to the liquor outlet at the lower end of the diffuser.

**Test Results:** The '60 pilot operations have scored four results: (1) an extraction of 97.5% can be obtained with water dilutions in the range of 45%; (2) the sugar produced from the diffused syrup appears to be better than sugar produced from conventional mill juice; (3) power consumption for preparation and dewatering is about the same as for conventional mills, but lower in the diffuser phase; (4) maintenance costs are estimated at less than half those of a conventional milling plant.

With the new diffuser averaging 97.5% extraction, compared with an average of 93.6% in Hawaii's conventional mills, the new process could bring \$5 million of increased revenue to the islands.

But it's too soon to pinpoint the change. Conventional mills are on the way out, but future sugar producers have yet to choose between the Hawaiian and the Fellsmere process.

## Changing Engineer

Management men responsible for directing the activities of chemical engineers will find food for thought in a conference Nov. 29-30 at the Hotel Muehlebach in Kansas City, Mo. Theme: "The New Chemical Engineering."

Jointly sponsored by Midwest Research Institute and *Chemical Engineering* magazine, the conference is designed to take a penetrating look at the radical transformation that has taken place in chemical engineering practice—and what's ahead for this science.

According to one speaker, the new chemical engineer will need a greater understanding and working knowledge of fundamentals (chemistry, physics and mathematics) to do a better—and

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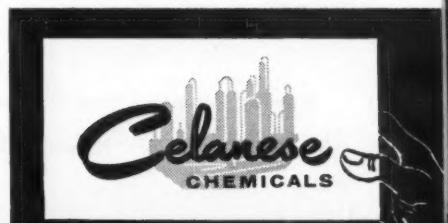
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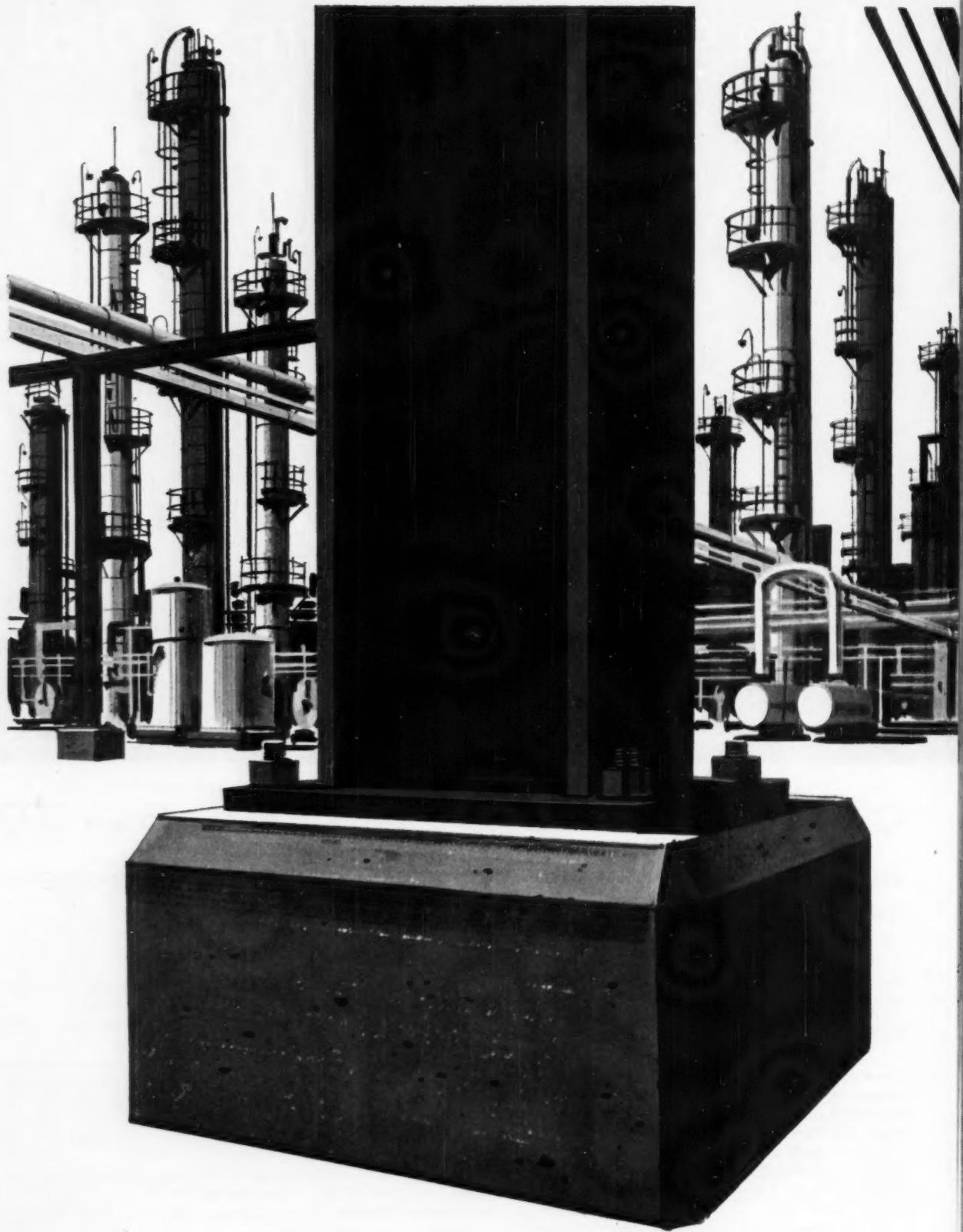
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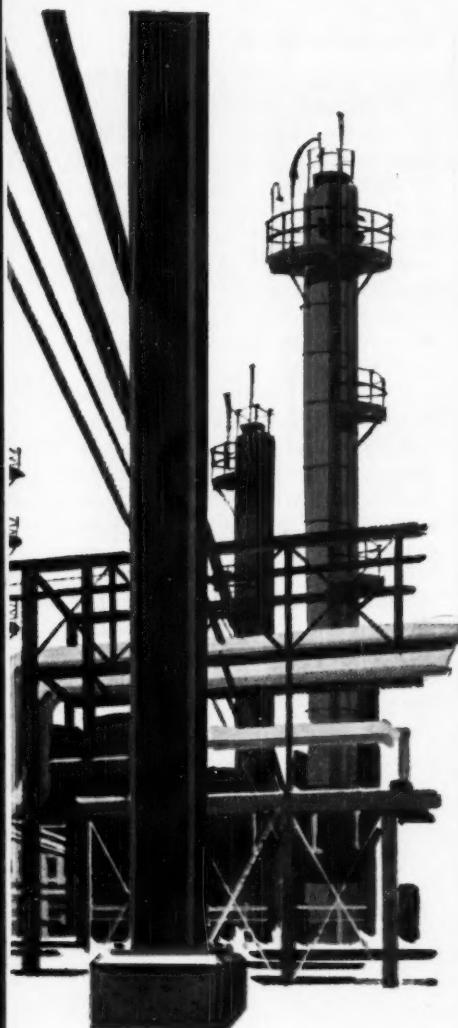
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## ENGINEERING

more profitable—job in industry. Already several universities are teaching chemistry via a new approach. Instead of dividing the subject strictly into organic, analytical, and physical chemistry, it is taught on a more integrated basis. These three traditional divisions are meshed to arrive at the over-all concepts. And solid-state chemistry is included in the chemical engineers' curricula.

One session deals only with the "New Mathematics." It's pointed out that a chemical engineer uses mathematical techniques that go beyond the usual undergraduate engineering program. Control problems and process evaluation require numerical analysis and statistics. Now that virtually all chemical engineers have computers for solving problems, they can be expected to use mathematical techniques that only a few years ago were considered too tedious.

Other new chemical engineering tools that will be discussed at the conference include the concept of systems engineering, information retrieval and operations research.

In the two final-day sessions on "The New Tools of the Engineer," systems engineering, process kinetics, information retrieval, process statistics and operations research will be considered.

Topics to be covered include: Systems Engineering, by T. C. Wherry of Phillips Petroleum Co.; Process Kinetics, by Henry Eyring of the University of Utah; Information Retrieval, by J. W. Perry of the University of Arizona; Process Statistics, by T. L. Koehler of American Cyanamid Co.; and Operations Research, by J. C. Hetrick of Arthur D. Little, Inc.

At the conference, four specific operations research cases will be discussed: (1) how to aim research and development work at a specific problem; (2) scheduling capital investment; (3) bulk storage of many varying products; and, (4) rotating personnel in the three shifts of a continuous process.

Keynote speaker: Sidney Kirkpatrick of the McGraw-Hill Book Co. (and former editorial director of *CW*). Other speakers, who will round out the new chemical engineering concept: C. N. Kimball, president of the Midwest Research Institute, and Vice-Admiral W. F. Raborn, U.S. Navy.

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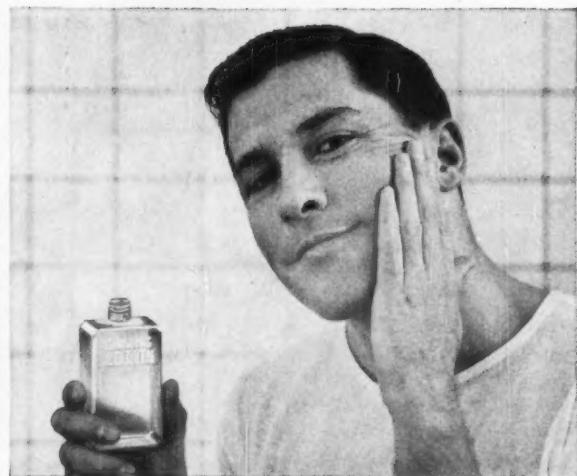
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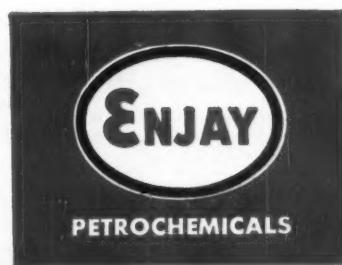
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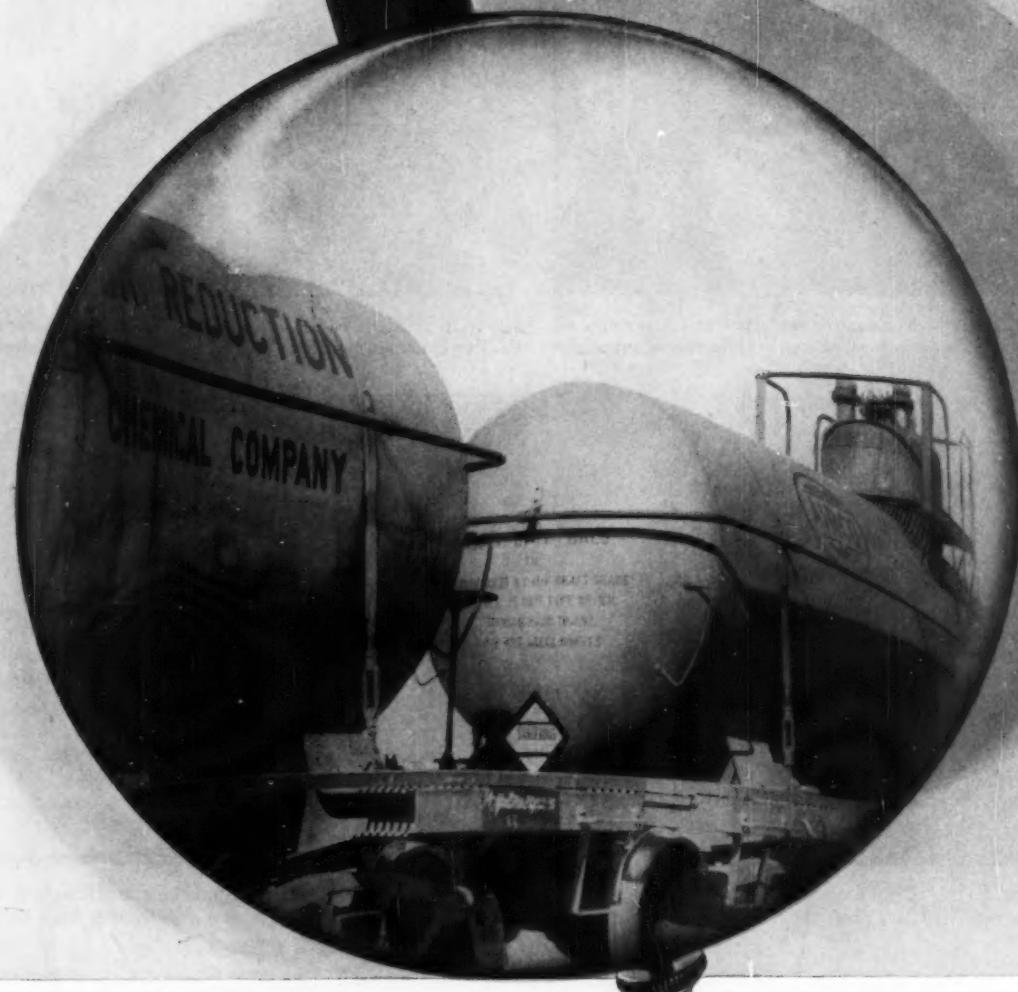
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# Washington Newsletter

CHEMICAL WEEK  
November 19, 1960

**Kennedy's foreign economic policy lines** will be drawn relatively fast and firm, despite the narrowness of his victory and the conservatism of Congress (see p. 23).

On balance, the new Administration's foreign trade approach will be more liberal than Eisenhower's. This is the word from Kennedy's advisors, who discount substantially his campaign concessions to a "need to protect" certain domestic industries.

What the President-elect has in mind by way of "protection," for example, is a renovation of an old labor-inspired proposal for a federal trade adjustment program. This would provide for the compensation of domestic producers who can actually prove injury from foreign import competition—through a combination of such aids as subsidies, tax relief, worker retraining and relocation, and others.

This does not mean that existing avenues to domestic import protection will soon be scrapped. Peril-point, escape clause, antidumping, defense essentiality and other means of protection have been strengthened by recent Congressional actions.

U.S. negotiators at the GATT sessions in Geneva next year reportedly may offer fewer import concessions than believed earlier this year, particularly in the chemical and mineral categories. At the Tariff Commission, whose moderately freer-trade make-up will not be changed by new appointees for some time, peril-point findings will lead to a packet of new escape-clause actions.

**Kennedy is looking toward a complete revamping** of the trade laws when the Reciprocal Trade Agreements Act comes up for renewal in '62.

Among Kennedy's goals: a new attack on the European trade bloc split, with efforts at lowering the trade barriers of both; and a possible shift from multilateral trade bargaining on specific items to regional negotiations, which might include automatic, across-the-board tariff cuts.

Freer trade policies will also be geared to boost U.S. exports. Kennedy by no means favors unilateral U.S. import concessions without stepping up the drive begun under Eisenhower to expand U.S. export sales.

Kennedy also has some major foreign aid changes in the works. U.S. social and economic development aid probably will be housed in a new agency, and an effort will be made to put it on a longer-term basis, say five years at a time, with Congressional approval.

**A heavier rate of research and development** defense contracting and procurement should flow from Kennedy's ambitions to strengthen the defense program.

# Washington Newsletter

(Continued)

Kennedy wants to expand the U.S. retaliatory strike forces and modernize conventional forces to fight limited wars. In general, he is thinking about accelerated production of Minuteman, Polaris and tactical missiles as well as new bomber aircraft and combat vehicles.

In the campaign Kennedy called for a \$2.5-billion boost over the current \$41.5-billion military spending level. But he is vague about whether this is to be a '61 increase in the budget, regular increases each year as proposed by the Rockefeller committee, or a staggered increase to bring spending to that level in two or three years. Actually, Kennedy has thought little about defense details.

**The President-elect is eager to attract top businessmen** into his Administration. But he has told associates he wants no short-terminers—businessmen who take a big job just long enough to get the title and prestige, make contacts, learn the ropes, and go back to industry.

**Early in the new Administration** you can count on significant changes in the regulatory commissions. James Landis expects to come up with recommendations by mid-December at Kennedy's request. (Landis was dean of the Harvard Law School, has been chairman of two regulatory agencies and a member of a third.) Landis will make recommendations both on Kennedy appointments and on ways of speeding up final decisions.

Kennedy can name new chairmen all around, and has many vacancies waiting to be filled at Federal Trade Commission, Securities & Exchange Commission, Civil Aeronautics Board, Federal Power Commission, Interstate Commerce Commission, Atomic Energy Commission, the National Labor Relations Board and the Federal Reserve Board.

*At FTC*, Chairman Earl Kintner and Edward K. Mills, Jr., both Republicans, have not been confirmed by the Senate to new terms. By naming one Democrat, Kennedy gets a majority. Kintner may be kept on, but not as chairman.

*At ICC*, one vacancy exists and Chairman John Winchell's term expires Dec. 31. Kennedy can get an immediate six-to-five majority.

*At FPC*, a vacancy exists, one GOP appointee has not been confirmed and another's term expires next June.

*At NLRB*, one member was not confirmed by the Senate, and another term (a Democrat named by Eisenhower) expires in August.

*At FRB*, any changes will come slowly. Chairman Martin's chairmanship runs (by law) until April 1, '63; the first member of the seven-man board whose term expires is that of M. S. Szymczak, a Democrat on the board since the '30s.

*At AEC*, only one seat is vacant, and the next term expires June 30, '62. Chairman McCone would like to stay on.



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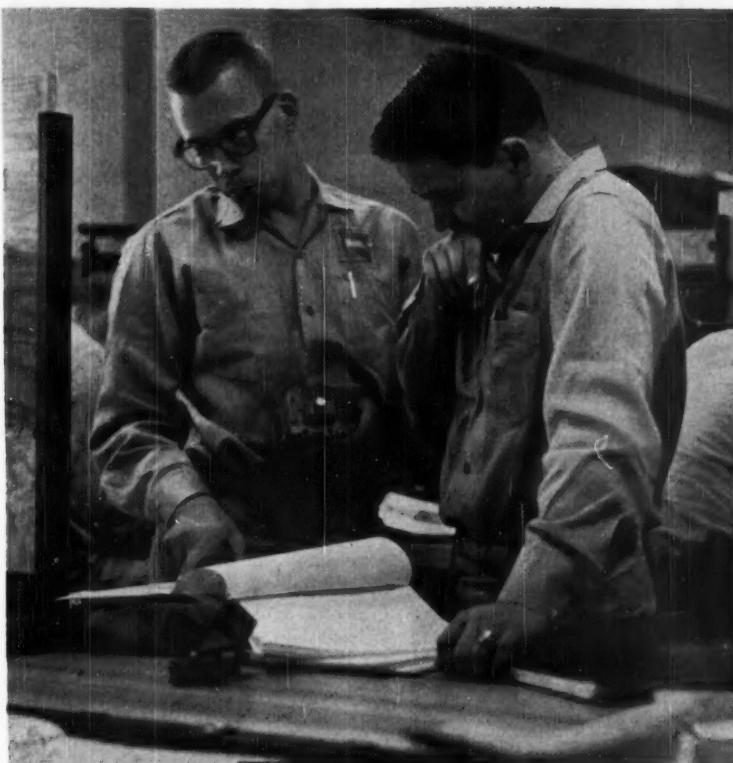
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**Monsanto supervisors study instruments first, follow with theory.**

## Molding an Instrument Man

The men pictured above are partners in an experiment in training. If it pays off, Monsanto Chemical—its sponsor—hopes, it will foster improved plant instrument installation, operation and maintenance. Moreover, it should gain the attention of other chemical companies where the upgrading of instrument work is considered one of today's most serious problems.

But it will turn even more heads if it pays off as John Warren, senior instrument engineer at Monsanto, hopes. Warren, who is conducting the training experiment, feels that it may cut, rather than increase, the training time for instrument men—a reverse in industry's current training trend.

Monsanto and Warren are pinning their hopes on training instrument supervisors by functional techniques, then getting the supervisors to use the same techniques to instruct in-

strument mechanics at the plants. Actually, functional training, which reverses the traditional training techniques by starting with instrument hardware and working back to theory, has been used in a Monsanto instrument mechanic training program for about three years. "We're trying to find out now whether it can be used successfully to train supervisors, too," says Warren.

**Backing In:** Warren, who considers himself somewhat of a maverick when it comes to training programs, points out that functional training is nothing new. It's familiar to most educators. But most training programs still start with theory, show how it is applied. And supervisors, many of whom have had some college training, have probably been less exposed than mechanics to training programs that actually "back into" theory.

Warren feels that functional training for supervisors is as sound as it is

for mechanics. It plunges the trainee into the subject, draws his interest because he works immediately with familiar instrument hardware. And it helps him understand theory, which is introduced to him only to explain what is happening after he has actually seen the event occur.

A small classroom has been set up at one end of the workshop. "In most training programs, the classroom and the laboratory work area are sharply separated. We've tried to keep them together," says Warren.

The trainees study the function of an actual instrument part (e.g., a relay) to establish what it is and does. The part, as it has been designed and used by various instrument makers, is compared with the basic function in its simplest form. "We never try to compare the instruments of various manufacturers with each other because such a comparison can become too complex," says Warren.

**The Reason Why:** The supervisors are using the same manual that was prepared for mechanic training. But there is a difference in program concept. "We like mechanics to understand why an event occurs. But supervisors must understand why it occurs," says Warren.

Examinations have been set up to test understanding. Hour-long quizzes are given every few days. And, at the end of each four-week section of the course, which runs six days a week for a total of 12 weeks, an examination that lasts four to eight hours is given. The examinations are essay type, cover information that won't permit the trainee to rely strictly on memory. "I'm not too concerned about correct answers. I'm more interested in the reasoning the trainees use to arrive at the answers," says Warren.

Set up in this way, the course is designed to stimulate thinking. "We want the trainees to reach their own conclusions about the merits of various instruments. And we show them instruments they've never seen before, get them to speculate about the function, potential application and good and bad features. This helps them to become self-sufficient when it comes time to select new instruments in the plant," says Warren.

In the program, 85 instruments are

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## PRODUCTION



Warren: 'To be most effective, training should be a line function.'

used in the workshop. They were selected for many reasons: some because of wide use in Monsanto plants, some because they best illustrate basic principles, some because they are new instruments with a bright potential.

The number of different types of instruments is larger than the trainees will meet in any one plant, but has been restricted to pneumatic types. Analytical and electronic instruments will be the subjects of future courses if needed.

The present course was begun at the request of the company's Inorganic Chemicals Division, has become company-wide. Ten trainees are attending and a second group is waiting for another round next year. The present group includes trainees with a wide variety of backgrounds from engineering college to high-school graduates; from men with over 15 years of experience to new employees.

**Waiting for Results:** How effective the program will be remains to be seen. Evaluation will take time because effectiveness will be based mainly on how well the present trainees are able to instruct the mechanics in their plants.

"Training should be a line function, performed by plant management if it is to be most effective," says Warren. "All we are trying to do is to give them tools to make training as effective—yet as simple—as possible."

Warren has some indication that the program can be effective. Before

Here are the profit-producing benefits of PANASOL Aromatic Solvents: (1) High solvency. PANASOL Solvents blend readily and easily with active ingredients. (2) Safety from crop damage. They let you formulate with the assurance you're using quality solvents that have been field tested on corn, cotton, tobacco and a variety of vegetable crops. (3) Fast delivery and sure service. Your solvent is there when you need it to help you move your inventory and make a profit. (4) Skilled technical service from experienced solvent specialists is at your call.

Get all the facts about the full line of PANASOL Solvents. Your inquiry will get immediate attention.

*Quick facts about PANASOL Solvents*

PANASOL RX-4. For formulations where low phytotoxicity is important. Excellent substitute for xylene. Very high K-B value and aromatic content. Particularly suited for corn and tobacco pesticide formulations.

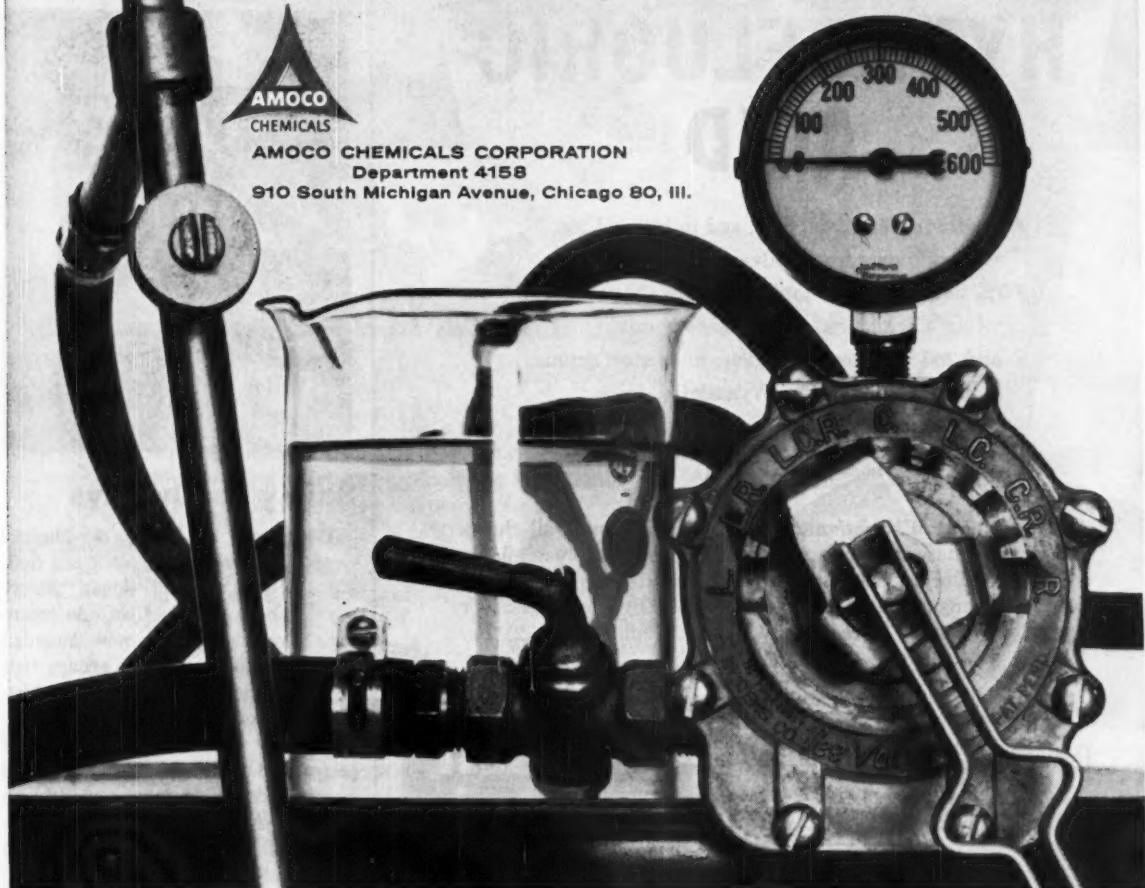
PANASOL AN-2K. Excellent solvent for DDT, chlordane, lindane and dieldrin. Particularly compatible with emulsifiers. Has high solvent power, uniform quality. Especially suited for use on cotton.

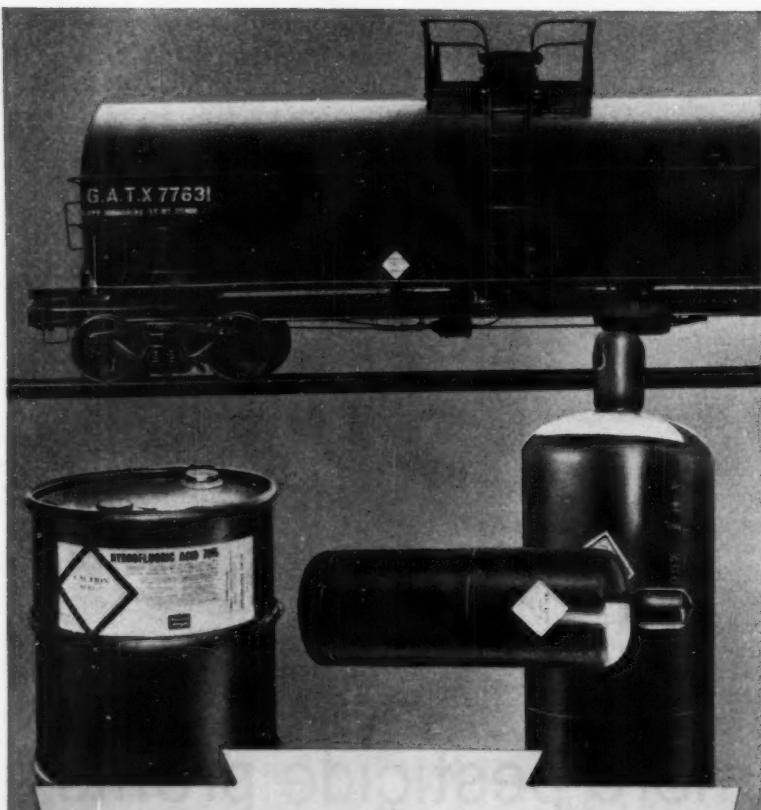
# The 4 benefits you get with PANASOL Solvents

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Write for Pennsalt HF handling aids: manuals and wall charts covering all phases of HF handling, storage and safety available on request. Personalized technical service freely provided by experienced engineers. Industrial Chemicals Division, PENNSALT CHEMICALS CORP., Three Penn Center, Philadelphia 2, Pa.

### Industrial Chemicals Division

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INDUSTRIAL QUÍMICA PENNSALT, MEXICO CITY



### PRODUCTION

the supervisors' course was set up, the training manual and functional techniques were used by a supervisor at Nitro, W. Va., to build an instrument mechanic staff from scratch in record time.

"It's a sign that long instrument training programs may not be necessary," he says. And Monsanto as well as others are hoping he's right.

### EQUIPMENT

**Temperature Transmitter:** Taylor Instrument Companies (Rochester 1, N.Y.) is adding a gas-actuated model to its Sensaire 202T line of temperature transmitters, which have heretofore been mercury actuated. The force-balance instrument will measure temperatures as low as —400 F with 1% accuracy. It is available with range spans of 100 F, 200 F and 400 F.

• **Level Control:** The Sonoswitch, which has an ultrasonic probe for controlling liquid level in vessels and



### Safety Really Pays

Employees at Metal & Thermit Corp.'s Carteret, N.J., plant are finding out that the old slogan "safety pays" can have more than one meaning. Silver dollars are now awarded to each member of plant groups that complete the month without a lost-time accident or doctor's case requiring three visits. The group leader gets \$5; the safety leader \$4; group members \$2 each. In two months so far there have been no lost-time accidents and minor accidents have been cut 80%.



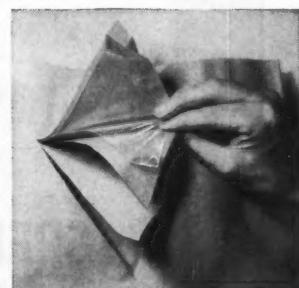
## "This new CHASE POLY-PLY multiwall bag is a real Problem Solver"

*Says Lee Schram, Multiwall Bag Buyer, Morton Salt Company*

The Morton Salt Company needed a new and better bag for its salt shipments—a moisture-resistant bag that would be easier to handle and ship, more flexible at low temperatures, highly resistant to abrasion and rupture, yet economical in cost.

To solve this problem, Chase developed the Poly-Ply Multiwall Bag featuring an entirely new construction. It combines—for the first time—the advantages of a ply of light-weight sheet polyethylene and heavy-duty multiwall paper. It provides excellent moisture protection...extra strength...new ease of handling...flexibility even at temperatures way below zero. After six months testing under commercial conditions Morton officials report highly satisfactory results!

If you package moisture-sensitive products—such as sugar, chemicals or fertilizers—this new bag can be a problem solver for you, too. It is now available in 25-, 50- and 100-pound sizes. Call your Chase representative for full information.

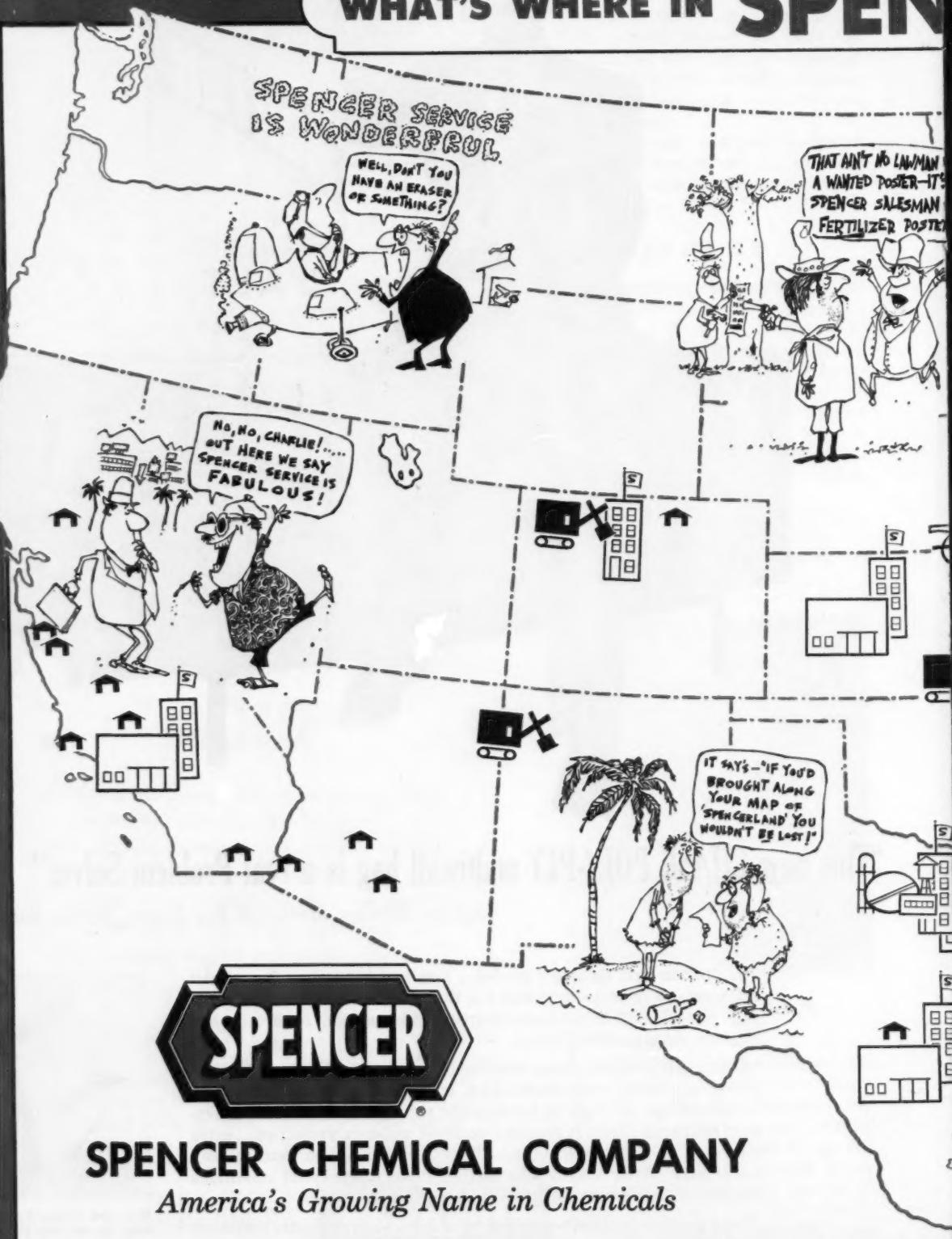


**New and Unique Construction:** separate, intermediate ply of sheet polyethylene, shielded by heavy-duty kraft paper inside and out, assures effective moisture protection, strength and easy handling advantages.

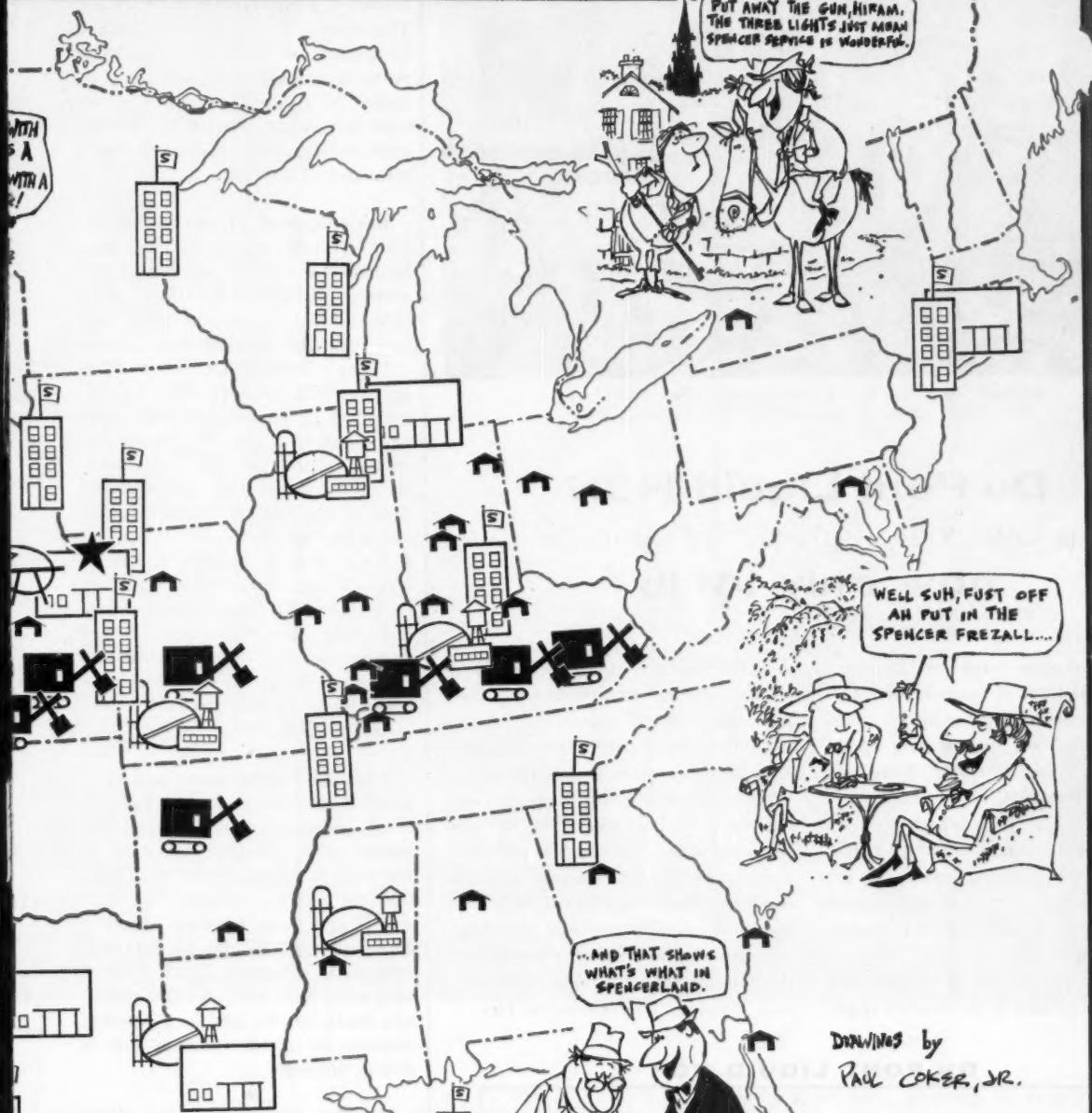
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# ICERLAND U.S.A.



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DRAWINGS by  
PAUL COKER, JR.

## Legend



## SPENCER PRODUCTS

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"Mr. N" Ammonium Nitrate Fertilizer • SPENSOL GREEN (Spencer Nitrogen Solutions) • SPEN-AMM Anhydrous Ammonia • URA-GREEN and ANA-GREEN (Direct Application Solutions) • Spencer Urea Fertilizer.

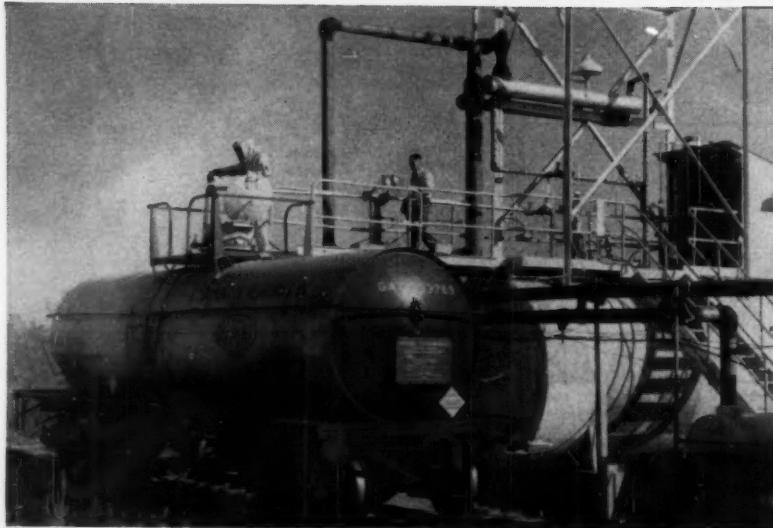
### PLASTICS DIVISION

"Poly-Eth" Polyethylene • Spencer Nylon • "Poly-Pro" Propylene.

### INDUSTRIAL CHEMICALS DIVISION

Ammonia (Commercial, Refrigeration and Metal Treating Grades) • Argon • Spencer Nuclear Fuels • Aqua Ammonia • Methanol • Formaldehyde • Nitric Acid • Prilled Ammonium Nitrate • 83% Ammonium Nitrate Solution • FREZALL (Spencer Dry Ice) • Liquid CO<sub>2</sub> • Cylinder Ammonia.

THE PITTSBURG & MIDWAY COAL MINING CO.  
(Wholly owned subsidiary of Spencer Chemical Company)



Du Pont, the pioneer in tank-car shipments, offers expert help in the handling, storage and use of bulk liquid hydrogen cyanide.

## Du Pont Liquid HCN a low-cost, high-purity cyanide now only 14¢ lb.

Liquid hydrogen cyanide is the most economical form of cyanide needed in the production of organic nitriles, plastics and finishes, sequestering agents and many other products. Your best source of liquid HCN is Du Pont.

Du Pont liquid HCN is high in purity—99.5% minimum; low in water content—0.5% maximum. Result: you get less by-product formation and cleaner reactions. As a source of the cyanide radical, liquid HCN is much lower in cost than other forms of cyanides and is easier to process to the reaction stage.

And Du Pont's centrally located plant in Woodstock, Tenn., gives you a reliable, fast source of supply.

Du Pont has the experience and practical know-how to help make liquid hydrogen cyanide a profitable part of your operation. Du Pont will be glad to work with you in establishing safe practices and designing the storage facilities needed to handle bulk liquid HCN. For more information call your Du Pont representative or write: Du Pont, Electrochemicals Department, Sodium Products Division, Wilmington 98, Del.

### DU PONT LIQUID HCN

QUALITY	SPECIFICATION	TYPICAL ANALYSES
HCN	99.5 min.	99.8%
Acidity (as $H_2SO_4$ )	0.06% min. 0.10% max.	0.08%
Color	Not darker than APHA 20	Water white
$H_2O$	0.5% max.	0.12%



BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY

### PRODUCTION

tanks, is a new product of Powertron Ultrasonics Corp. (Patterson Place, Roosevelt Field, Garden City, N.Y.). The control is explosionproof, won't be misled by foam or froth. The probe is stainless steel, has a repeatability of a few thousandths of an inch that is not affected by film or scale buildup, will operate at pressures over 2,000 psi.

**Environmental Control:** Philco Corp. (Philadelphia 34, Pa.) and Midland-Ross Corp.'s J. O. Ross Engineering Division (730 Third Ave., New York 16) are marketing new equipment for environmental control.

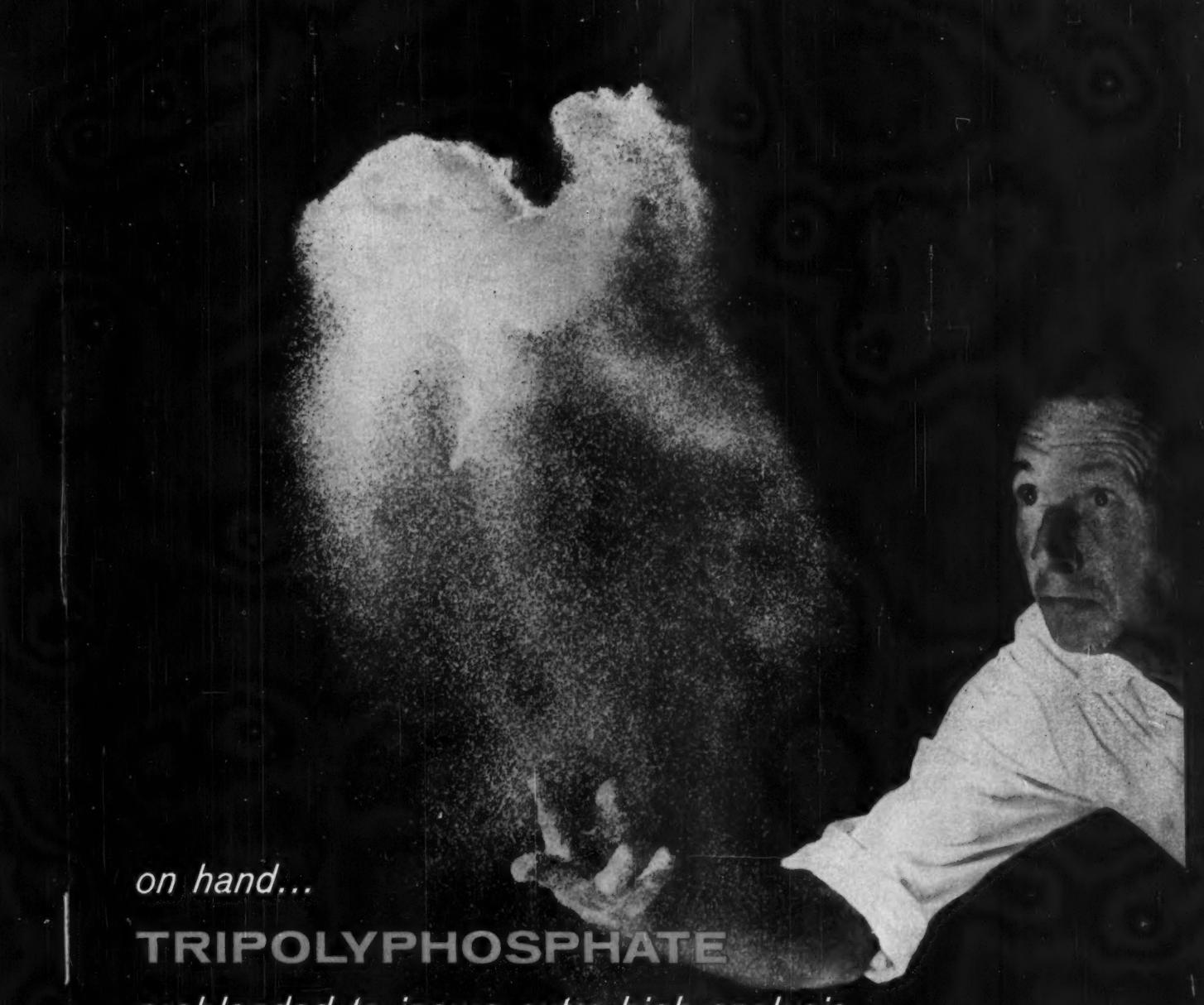
Philco's Lansdale Division is offering complete, modular-controlled atmosphere systems that include vacuum equipment and dry boxes for precise control of dust and atmosphere. The equipment was originally designed for Philco's automated semiconductor facilities.

J. O. Ross is offering a line of seven packaged units for air make-up. Each unit is 7 ft. high, 7 ft. wide and 8 ft. long, has intake louvers, bird screens and shut down dampers. A gas burner inside the enclosure heats winter air to 80 F. Capacities: 20,000 to 80,000 cfm.

**Vibration Protection:** A new electronic device for protecting gas turbines, pumps, motors, fans and impellers from excessive vibration is offered by Stewart-Warner Corp. (1826 Diversey Pkwy., Chicago 14). The unit is said to be sensitive to vibrations of two-millionths of an inch amplitude. It flashes a signal, or stops equipment that exceeds safe vibration limits, can be used as a portable balancer to correct vibration with a plug-in accessory.

**Grouting:** The Ceilcote Co. (4832 Ridge Road, Cleveland 9) now has a new resin-based grout for gas compressors that is said to eliminate misalignment, shearing of anchor bolts and crankshaft damage. The grout, called No. 648, can be poured at depths to 6 in. It sets quickly, permits compressors to be returned to operation in 24-48 hours. The grout is impermeable to most oils, acids and alkalies. Tensile strength: 1,950 psi.; compressive strength: 15,000 psi.

**Corrosionproof Drain Valve:** An



on hand...

## TRIPOLYPHOSPHATE

preblended to insure extra-high analysis

A new process is used to make AA Quality Sodium Tripolyphosphate. It includes a special operation that preblends the reactants before calcining. You benefit from the extra detergent strength that is developed and carried through to the finished product.

You also benefit from a free-flowing uniformity. It comes from the careful control built into thoroughly modern spray drying and calcining units. Send for production samples of this new "Tripoly" now!

*Top detergent quality in every granule...*

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PRODUCTION

impervious graphite drain valve is a new product of Falls Industries, Inc. (Solon, O.). The valve has a piston closure without seats. It is claimed to be immune to thermal shock, cracking and chipping. Operating conditions: 340 F and 150 psi. Sizes: 2, 3, 4 and 6 in.

**Corrosive Coating:** The Esbec Corp.'s Chemical Specialties Division (P.O. Box 929, Stamford, Conn.) is offering a new neoprene-base, anti-corrosive coating for structural steel. Called Perfecote Formula 701, the coating is said to combine the advantages of neoprene and asphaltic materials. It can be applied by spray, brush or roller to damp surfaces, requires no primer.

**Flame Detector:** Bailey Meter Co.'s (1050 Ivanhoe Road, Cleveland 10) new solid-state flame detector for monitoring furnace burners has a sensing element that will withstand temperatures to 600 F. The unit, tagged Type UF1100B, will respond to radiation in the 2,000 to 2,800 angstrom range. It responds only to flame under surveillance, is not affected by adjacent flames and glowing refractories.

**Plastic Welder:** Model 14-HW is Kamlar Products Co.'s (932R Washington St., Norwood, Mass.) new unit for tacking and hand welding thermoplastics such as polyethylene, polypropylene and polyvinyl chloride. The welder has a 320-watt heating element for 115-volts ac., a round tip, a tacker tip and a needle valve for air-flow control. The unit is made of stainless steel, has a 16-ft. neoprene air hose.

**Portable Valve Operator:** The E. H. Wachs Co. (1525 North Dayton St., Chicago 22) now has a new portable device for opening and closing sticky valves. The unit weighs 38 lbs., can be supplied with quick-reverse air and electric motors that rotate at 20 rpm. A long, torque-arm handle acts like a wrench. A safety-stop control shuts off unit if operator loses control.

**Humidity Measurement:** Atkins Technical Inc. (1276 West Third St., Cleveland 13) is offering a new line of relative-humidity and dewpoint in-

**Problem:**

To speed up pepper grinding without losing volatile oils



**Solution:**

**SPROUT-WALDRON  
ROLLER MILLS**

To grind pepper to -40 mesh at production rates from 2-3000 pounds per hour without generating excessive heat or causing unnecessary loss of volatile oils, Durkee Famous Foods, Bethlehem, Penna., installed a Sprout-Waldron pepper grinding system.

Heart of the system is the one-point control double roller mill. Design of this unit permits operator to set and align rolls with complete accuracy in a matter of seconds. The higher the production requirements, the more important is this one-point control feature.

For full details on the Durkee system, ask for Pointers, Vol. 2 No. 5. For specifications on the roller mill request Bulletin 153-A.

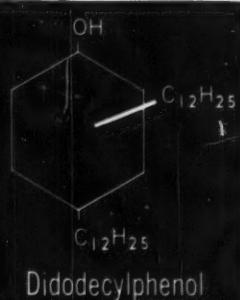
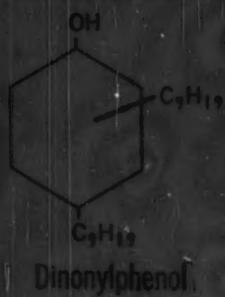


**SPROUT-WALDRON**

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## Levelling Agents

Shanco offers a series of alkali soluble resins for use as levelling agents in bright drying floor polishes.

The melting point varies to permit adjustment of film characteristics, as hardness and toughness of films; tendency toward powdering and flaking off may be overcome by proper levelling resin in correct amount.

For good levelling and high gloss in styrene polymer emulsion films, use Shanco L-1152, L-1127, or L-1135 resins.

In the use of acrylic polymers, a wide range of film characteristics may be secured with Shanco 334 and L-1159 resins.

Write for the descriptive booklet on this series of alkali soluble resins.



**Plastics & Chemicals Inc.**

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Toronto 18 • Montreal 22

## PRODUCTION

struments for measuring dewpoints as low as  $-150^{\circ}\text{C}$  in a few seconds. The instruments are said to be accurate regardless of gas flow rate, can be used to check static gases. The units have a dial gauge. Sensing probes are not affected by most dusts and pressures up to 2,000 psi.

**Sewing Pedestal:** Richardson Scale Co.'s (Clifton, N.J.) new sewing pedestal adjusts vertically and horizontally to fit various bag sizes, sewing heads, filter cords and tape sealers, eliminating the need for two-headed pedestals.

**Liquid Nitrogen Pump:** Marine Products Co. (515 Lycaste Ave., Detroit) is offering a new all-aluminum pump with stainless steel fittings for liquid nitrogen service. The pump is self-priming, has a built-in check valve to prevent siphoning. The new unit comes in 1½- and 2-in. sizes with 100- and 140-gpm. capacities.

**Relief Valve:** Where high sensitivity and corrosive-chemical service are the requirements, Farris Engineering Corp. (Palisades Park, N.J.) recommends its new 1000 Series diaphragm relief valve. The valve provides a vapor-tight seal, even in nitrogen and other light-gas service. It is available with neoprene, molded Kel-F and stainless steel diaphragms and discs; Type 316 stainless steel, bronze and Hastelloy C are used for valve bodies. Sizes:  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$  and 2 in. with plain, packed and open-lever cap construction.

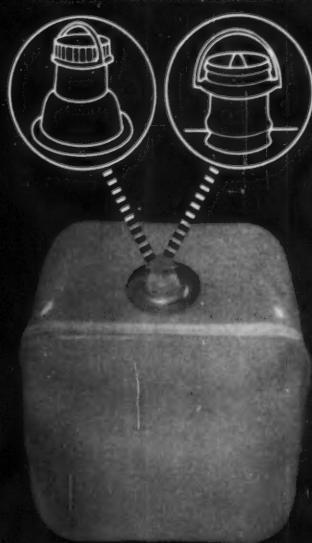
**Fast Thermocouples:** Press-Temp Products (1120 E. El Segundo Blvd., El Segundo, Calif.) offers a new line of thermocouples for applications where time response in milliseconds is required. Model 479-C shielded thermocouple has a 100-millisecond response to temperature changes from 32 F to 190 F. It can be used in the  $-300^{\circ}\text{F}$  to  $2,800^{\circ}\text{F}$  temperature range at pressures to 5,000 psi.

**Disperser:** Charles Ross & Son Co. (148 Classon Ave., Brooklyn 5, N.Y.) is marketing a new stationary tank disperser with a high-speed impeller of sawtooth-disc or closed, multiple-action millhead type. Impeller and shaft are made of stainless steel, operate at speeds up to 5,000 rpm.

## REPLACE CARBOYS with the 15-gallon <sup>®</sup> CUBITAINER

■ Single-trip ■ Lightweight ■ Low cost  
■ Simplified handling ■ Standard filling

FlexSpout\* or Screw Cap Closure



in an ICC-2U approved plastic cube



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# U.S.I. CHEMICAL NEWS

November 19

★

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

★

1960

## ATTENTION: Holders of U.S.I. Alcohol Catalog

U.S.I. has revised the Government Regulations Supplement to its Ethyl Alcohol Catalog to incorporate A&TTD's latest regulations on the distribution and use of Specially Denatured and Tax-Free Alcohols, which went into effect on July 1, 1960.

The new supplement has also been revised for greater ease of understanding. It is now available to all holders of the Ethyl Alcohol Catalog and others interested upon request on company letterhead. Address Technical Literature Dept., U.S.I. Chemical News, 99 Park Avenue, New York 16, N. Y.

## FDA Authorizes DL-Methionine for Dietary Supplements

In the Federal Register of August 4, 1960, the FDA announced that DL-methionine may be included in dietary supplements in amounts up to 200 milligrams per day. This announcement is based on findings that no undue risk to the public health is involved in the use of DL-methionine for this purpose.

Permission has been granted for a period of one year commencing March 6, 1960, or until regulations are issued establishing tolerances for DL-methionine or exemption from the requirement of tolerances, whichever occurs first.

DL-Methionine is an essential, sulfur-bearing amino acid used in dietary supplements along with vitamin preparations. It has also been used as an ingredient in cosmetics and skin applications, and for pharmaceutical and animal feed purposes since 1946.

## New Unit Makes Hydrogen From Ammonia on Demand

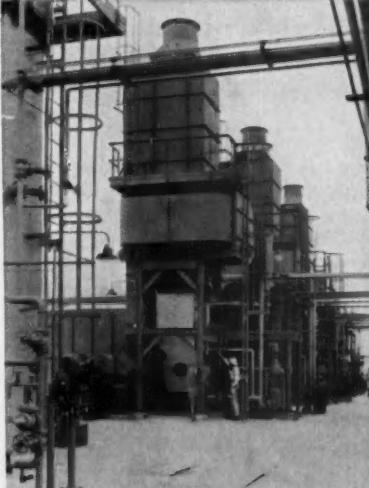
Pure hydrogen generating units with capacities up to 60 million stream cubic feet per year have been developed for small volume users of the gas in operations such as metal treating. The generators are said to yield hydrogen of 99.995% purity which costs less than cylinder gas and no more than hydrogen from electrolytic sources. In addition, it is claimed that the gas is purer than that obtained by electrolytic methods, containing no oxygen or hydrocarbons and less than 50 ppm of nitrogen.

MORE

## U.S.I. Doubles Polyethylene Capacity at Houston Plant

### New Expansion Makes Company World's Second-Largest Producer of Polyethylene Resins

A new section of U.S.I.'s polyethylene installation at Houston, Texas, is now on-stream. This latest expansion doubles the capacity of the plant, brings total production of PETROTHENE® polyethylene resins to 300 million pounds per year, and establishes U.S.I. as the second-largest producer of polyethylene resins in the world.



Steam generation units at U.S.I.'s 200-million pound polyethylene plant at Houston, Texas.

## Great Potential Seen for Pharmaceutical Aerosols

According to a recently published article, packaging and sale of aerosol pharmaceuticals are still way below potential, although these products are among the fastest growing in the aerosol industry. It is claimed that practically all types of topical products and respiratory tract treatments are aerosol potentials. Many systemic drugs also could be administered by aerosol inhalation. Here are some advantages listed for pharmaceutical aerosols:

- (1) contents remain sterile.
- (2) there is no danger of product contamination during topical application.
- (3) spread of infection during application is avoided.
- (4) application is fast and easy.
- (5) danger of accidental poisoning by ingestion is minimized.
- (6) many materials normally injected or taken orally can be inhaled.
- (7) packaging costs are low compared to the value of the product.

MORE

### Rapid Growth Since 1955

The company's first polyethylene facility, with an annual capacity of 25 million pounds, was started up at Tuscola, Illinois, in early 1955. This plant was doubled in 1956 and redoubled in 1957 to a capacity of 100 million pounds per year. Early in 1959, the Houston installation came on-stream, producing 75 million pounds of resin annually (soon increased to 100 million). The expansion just completed brings the Houston plant capacity up to 200 million pounds per year.

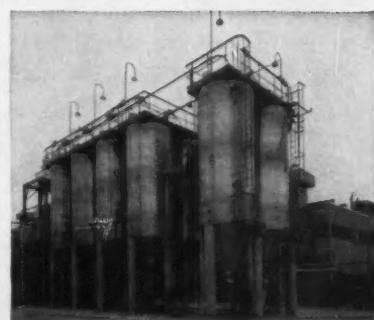
### Houston Location Convenient

The Houston installation is well situated on the Houston Ship Channel for shipment of resins by all means of transportation. Export shipments are easily made through the city's extensive port facilities. The plant is assured of a plentiful supply of ethylene—the major raw material—from salt dome storage facilities.

### Resins are Tailored to Use

Although U.S.I. makes a full line of low and medium density polyethylene resins for all applications, much of its growth in polyethylene has been based on special efforts to develop improved coating and film grade resins. The company pioneered the technique for producing crystal-clear cast film. Within the past six months it has developed and introduced a new

MORE



Product storage silos at U.S.I.'s 200-million-pound polyethylene plant at Houston, Texas.

November 19

1960

# U.S.I. CHEMICAL NEWS

CONTINUED

## Polyethylene

produce-bag resin, a new paper coating resin, a new cast film resin and two high-flow blending resins.

Tailor-making resins for specific purposes is one of the distinguishing features of U.S.I. as a polyethylene producer. For example, the company recently developed three new blow-molding resins particularly suited to bottles for drugs, cosmetics and chemical specialties. In all, the company markets some 80 resins today, each varying somewhat in melt index, density, strength, clarity, gloss, slip, stiffness and other properties.



View of U.S.I.'s 200-million-pound polyethylene plant at Houston, Texas.

CONTINUED

## Aerosols

The article suggests that if the pharmaceutical industry engaged in a concentrated promotional effort, aimed at doctors, pharmacists and the general public, its aerosol business could achieve a dollar volume in excess of \$200 million within the next decade. Medical science would also gain, from the development of better and easier methods of administering therapeutic medications.

CONTINUED

## Hydrogen Generator

According to the report, the new unit separates ammonia into its components by heating in the presence of a ferric oxide catalyst. The resultant gas mixture is then compressed, undissociated ammonia is removed by absorption, and the resultant gas stream is refrigerated, in stages down to -345 F. at 50 mm Hg abs. Nitrogen liquifies and is separated from the hydrogen, which is then analyzed for purity and stored for use.

## Columbium-Uranium Alloys Make Nuclear Fuels that Perform in 1,600°F. Range

Recent research work has revealed that columbium alloyed with 20% by weight of uranium metal yields a nuclear fuel which maintains high tensile strength and hardness in the 1,600°F. temperature range. This makes the alloy an excellent fuel for high-temperature, high-efficiency compact nuclear reactors such as gas-cooled units, it is claimed. The best metallic fuel elements used currently are said to be unable to withstand temperatures above 1,200°F.

## New Chemicals Listed In New Monthly Index

INDEX CHEMICUS, a new monthly index to new chemicals, can now be purchased on a subscription basis. The publication is said to report and index new chemicals within 30 days after their appearance in the primary journals.

INDEX CHEMICUS, contains listings of chemical names, structural diagrams, molecular formulas, and complete bibliographical information for each compound. Indexes are accumulated quarterly and yearly.

## TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

**A soluble form of cholesterol** is now available commercially. Is a 24-mol ethylene oxide ether containing 25% pure cholesterol (derived from lanolin). Claimed convenient, economical for topical preparations, including clear aqueous and alcoholic vehicles and emulsions. **No. 1650**

**New radiochemical catalog** now available lists over 400 radiolabeled compounds. Also describes high intensity beta and gamma sources, reference sources, radioactive standards, radio-chemical kits. **No. 1651**

**Twelve enzymes** now offered are described in new booklet. Include  $\alpha$ -,  $\beta$ -,  $\gamma$ -chymotrypsinogen,  $\alpha$ -chymotrypsinogen, deoxyribonuclease, hyaluronidase, hyaluronic acid, peroxidase, ribonuclease, trypsin, trypsinogen, uricase. **No. 1652**

**Ethyl acetate** is subject of new technical data bulletin. Covers three grades—commercial 85-88% ester, 95-98% ester, 99% ester (acetic ether). Data include specifications, properties, shipping information, uses. **No. 1653**

**18 Pre-formulated reagent test sets**, said to speed up procedures and cut costs in clinical laboratories, now on market. Procedures included. Sets described in leaflet available. **No. 1654**

**Lupin alkaloids and related compounds** are now being offered in research quantities for physiological evaluations. Compounds include lupinine, d-oxylupinine, d- $\alpha$ -isolupinine, d- $\alpha$ -isolupinine perchlorate, d-lupinine perchlorate, d-hydroxylupinine, 3-hydroxy sparteine. **No. 1655**

**Radioisotopes in science and industry** is discussed in new AEC report being sold. Summarizes Isotopes Development Program to accelerate peaceful use of radiation and reactor by-products in agriculture, medicine, chemistry, etc. **No. 1656**

**Glycerine in toilet goods** is subject of group of talks made by toilet goods experts and now available in reprint form. Talks were given at 1960 symposium of Glycerine Producers Assn. **No. 1657**

**Two new surface tensiometers**, one manual and one semi-automatic, now offered for measuring surface and interfacial tension by fast, accurate ring method. Suggested for oils, surfactants, cosmetics, drugs, insecticides, other. **No. 1658**

**Specially formulated emulsifier** for drugs and cosmetics is described in new brochure. Material is blend of cetyl and stearyl alcohols and higher alcohol sulfates. Formulations, clinical details, bibliography are included. **No. 1659**

## PRODUCTS OF U.S.I.

### PETROTHENE®... Polyethylene Resins

### MICROTHENE... Finely Divided Polyethylene Resin

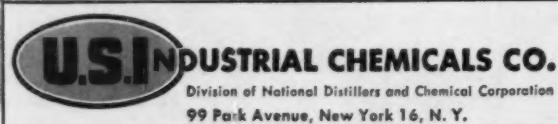
**Organic Solvents and Intermediates:** Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoyleacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

**Pharmaceutical Products:** DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

**Ethyl Alcohol:** Pure and all denatured formulas; Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL®M, ANSOL PR

**Heavy Chemicals:** Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphate Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide.

**Animal Feed Products:** DL-Methionine, MOREA® Premix (to authorized mixer-distributors).



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# Technology Newsletter

CHEMICAL WEEK  
November 19, 1960

**Chemical firms can now compare the jet engine-gas turbine power**  
plant of The Cooper-Bessemer Corp. and Pratt & Whitney Aircraft (*CW*, Sept. 12, '59, p. 55) with conventional industrial gas turbines and reciprocating engines. The first jet-powered turbine went onstream officially this week at Columbia Gulf Transmission Co.'s natural gas pipeline compressor station near Clementsville, Ky., and CG Vice-President Sy Orlofsky disclosed installation data.

The 10,500-hp. turbine station cost an estimated \$1,988,700—about \$190/hp. installed. According to Orlofsky, a comparable reciprocating-engine station would have cost an estimated \$3,832,500—about \$365/hp. installed—and a conventional industrial gas turbine station would have approached the engine-station cost.

The jet-powered turbine, which combines P&W's J-57 jet engine with a C-B power turbine, weighs 17 tons—3.2 lbs./hp. installed. Weight of 10,500-hp. reciprocating engines is about 65 lbs./hp. installed; conventional gas turbines, about 16.5 lbs./hp. installed. Other comparisons (on hp.-installed basis): the jet-powered turbine required 52 lbs. of concrete foundations, occupies 0.12 sq. ft. of floor space; a reciprocating-engine, 402 lbs. and 0.40 sq. ft.; a conventional gas turbine, 177 lbs. and 0.18 sq. ft.

**A new slow-burning solid propellant** of ammonium nitrate and rubber has won its developer, Olin Mathieson Chemical Corp., a contract with Douglas Aircraft. OM will develop gas generators for both stages of Douglas' Skybolt missile. The Skybolt, an air-launched ballistic missile under development for the Air Force, will use the gas generators to furnish secondary power.

**Diamond Alkali will use the Montecatini acetylene process** in its Deer Park, Tex., plant. The plant, to be completed late in '61, will use up to 112,000 tons/year of oxygen from the nearby oxygen plant of Union Carbide's Linde Division, will be engineered and constructed by C. F. Braun (Los Angeles) and will be the first Montecatini process acetylene plant in the U.S. Process claims: (1) increased production because of pressure at burners, (2) high heat recovery, (3) improved soot control.

**The second United Kingdom patent on isotactic polymers** has been issued to Montecatini by the British Patent Office. Titled "Method of Selectively Polymerizing Alpha-Olefins," the patent (No. 828,791) was jointly granted to Montecatini Societa Generale per l'Industria Mineraria e Chimica of Milan, Italy, and to Professor Karl Ziegler of Muelheim-Ruhr, Germany.

Claimed: a new industrial process for selective catalytic polymerization of  $\alpha$ -olefins having at least three carbon atoms in their molecule (e.g., propylene, butene-1, and styrene) to isotactic polymers. Titanium

# Technology

## Newsletter

(Continued)

chloride and metal alkyls are described as catalyst starting materials. Montecatini's first U.K. patent on isotactics was granted early in '59.

**Creation of an industrial research center for Louisiana** has been proposed by I. W. Patterson, executive director of the state's Dept. of Commerce and Industry. Like Mississippi's Industrial and Technological Research Commission (*CW, Sept. 10, p. 57*), it would be nonprofit, specialize in research problems for industry located in the state or planning operations there. Most staff members would be drawn from state universities and colleges on a part-time consulting basis, with much research farmed out to these same schools. The center would have a director of research and a central staff. A feasibility study for organizing the research center is being carried out by Louisiana Assn. of Chambers of Commerce managers.

**Bird impact-proof jet plane windshields have been developed** by Libbey-Owens-Ford Glass Co. (Toledo, O.) and several plane builders. Key: high-strength glass laminated with electrically conductive glass that creates heat (85-110 F), keeps the plastic interlayer soft and resilient. The new windshields will withstand the impact of a 4-lb. bird hitting them at 400 miles/hour.

**Costs of handling radioactive waste** at the Atomic Energy Commission's Hanford Works (near Richland, Wash.) have been disclosed by General Electric, which operates the plutonium production plant. The tab: nearly \$114 million invested in waste-handling facilities, which cost \$2 million/year to maintain. Another \$1 million/year is spent on waste-handling research.

As a result of its experience, GE believes waste-control programs that are as safe as Hanford's, but less expensive, could be set up at future atomic energy plants. Also, other nuclear sites using these methods could be located nearer population centers; reactor coolant water can be safely discharged to large rivers; and radioactive particles in atomic waste gases can be effectively removed by modern filtration and scrubbing techniques. Disposal of high-level wastes will take more study, however, GE believes.

**Zinc oxide is being produced by a new process** in a 500-tons/month plant placed onstream this week by Sipi Metals Corp. (Chicago). In the process, zinc die castings are smelted down and fed into a vaporization chamber. Zinc boils off as vapor in the chamber while impurities, mostly aluminum, remain in the slag. The vapor is fractionated and the heavy metals portion is taken off before passing the rest to a flash-oxidizer for conversion into zinc oxide.

Most zinc oxide producers use primary zinc rather than die castings as raw material, but this new manufacturing scheme is said to result in operating efficiencies that permit the price of zinc oxide to be cut from 13.5¢/lb. to 12.5¢ for customers within 500 miles of Chicago.

New member of the Oncor® family-23A...

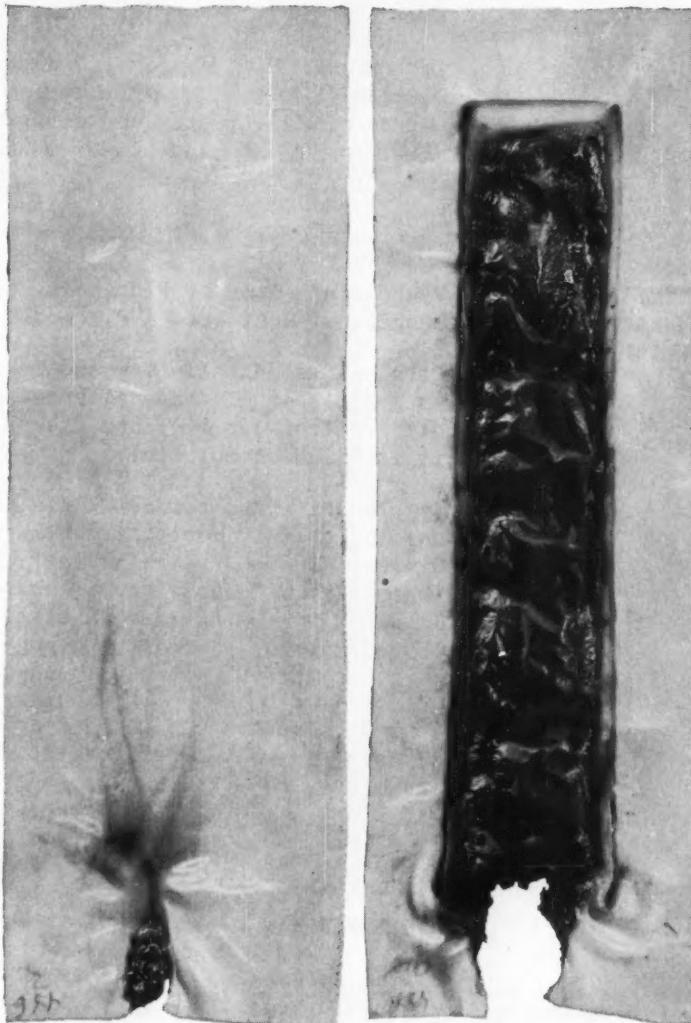
## A unique pigment for flame retardance in halogenated plastics and paints

Never before has there been a pigment like ONCOR® 23A, developed especially for compositions based on halogenated resins. This pigment is composed of an inert silica core of low specific gravity, and has a surface layer of antimony oxide fused to the core.

Here's a quick run-down on the outstanding features of this significant new ONCOR pigment:

1. **Effective Flame Retardance** — ONCOR 23A pigment compares favorably with conventional antimony oxides in flameproofing efficiency in halogen-containing resins for plastics and paints. In tests on vinyl films, ONCOR 23A pigment has given equivalent flame resistance compared to conventional antimony oxide, on an equal weight basis.
2. **Low Tinting Strength** — ONCOR 23A pigment has a low and uniform tinting strength. In vinyl film tests, tinting strength consistently measures between 60% and 65% of a conventional antimony oxide standard. This allows most effective use of colorants.
3. **Low Specific Gravity** — Because of its special physical structure, ONCOR 23A pigment has a lower specific gravity than regular antimony oxides. This means a higher volume yield per pound of pigment.
4. **Excellent Dispersion Characteristics** — as a result of careful production controls, ONCOR 23A pigment has a particularly uniform particle. This assures consistently good dispersion in both plastics and paints.

ONCOR 23A pigment is suggested for use in all halogenated plastic and paint compositions requiring flame resistance. It may be used with polyvinyl chloride, vinyl chloride copolymers, chlorinated paraffins, chlorinated rubber, chlorosulfonated polyethylene, chlorinated polyesters and the commercial fluoropolymers. Additional information on the new ONCOR 23A pigment is provided in the National Lead Company Data Sheet just off the press. The handy coupon at the right will bring you a copy by return mail.



WITH ONCOR 23A

These two samples show typical flammability test results on vinyl film, following the procedure specified in ASTM D-1433-58. (See Item 1 in text.)

KC-6205



National Lead Company: General Offices, 111 Broadway, New York 6, N.Y. In Canada: 1401 McGill College Avenue, Montreal.

Gentlemen: Please send your new Data Sheet for ONCOR® 23A, antimony silico oxide pigment for flame retardance in halogenated plastics and paints.

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Pigment...A Development of

**National Lead Company**  
General Offices: 111 Broadway, New York 6, N.Y.

# CHEMICALS OUTLOOK

November, 1960



This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

## FROM WYANDOTTE FOR URETHANES: NEW HEXOLS . . .

Wyandotte's line of Pluracols for urethanes continues to lengthen. Just out: a Pluracol® SP-760 hexol (OH number 490).

Developed especially for use in rigid urethane foam systems as well as in urethane elastomers and coatings, this new hexol differs from our Pluracol diols, triols, and tetrols in that it is based on sorbitol.

At present, Pluracol SP-760 is the only sorbitol-based member available, but additional ones will be developed shortly. Pluracol SP-760 is available in commercial quantities and meets the strict standards prescribed by the urethane industry. If you are working in this field, you'll want to investigate this polyether. We'll be happy to send you samples for laboratory evaluation, along with suggested formulations.

## ... AND NEW AMINE CATALYST

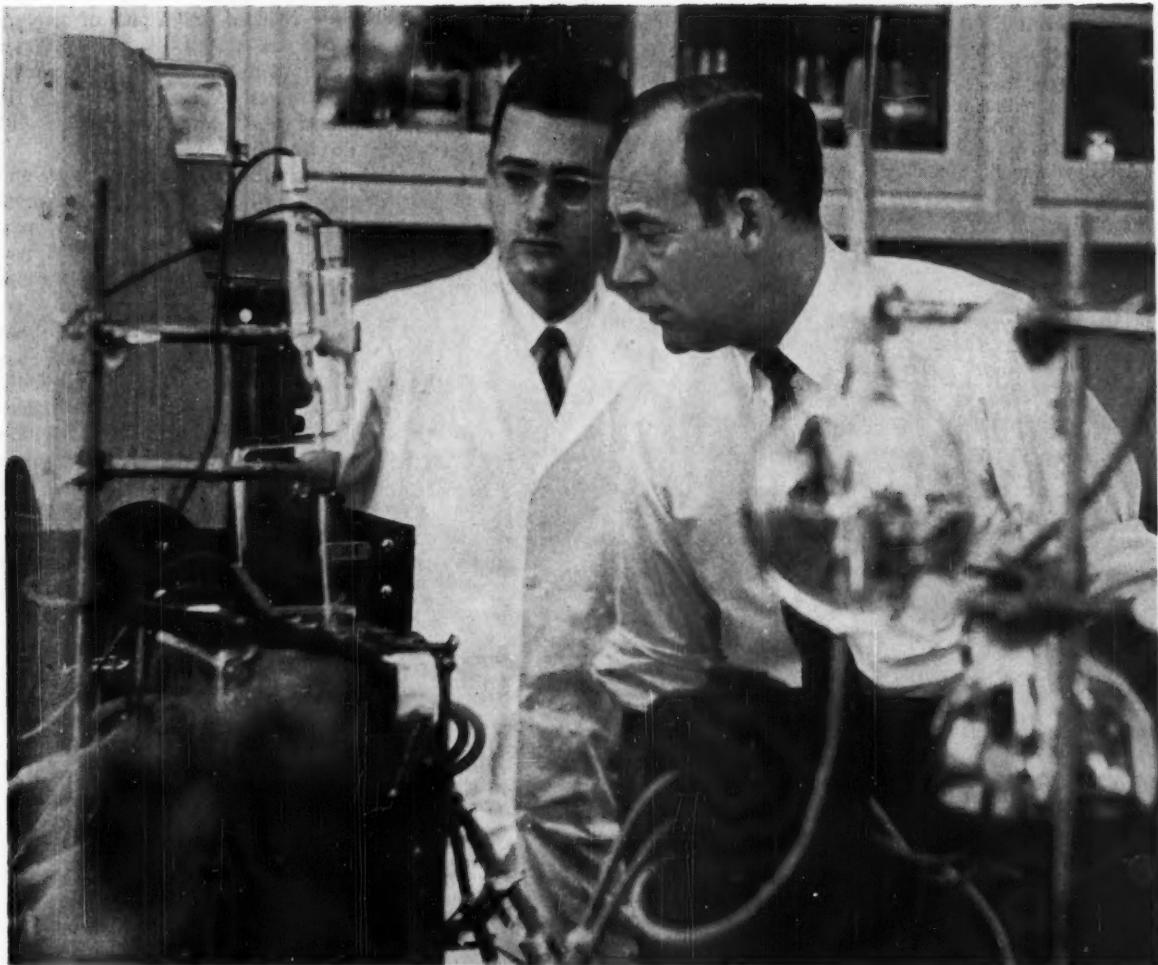
To induce moderately rapid reaction rates in urethane formulations, Wyandotte has developed a new catalyst . . . 1,2,4-trimethylpiperazine. It is a liquid tertiary amine with excellent solubility in water, acetone, methanol, and benzene. It offers a number of important advantages: handling ease, low vapor pressure at polymerization temperatures, lower odor level, and comparatively low cost. Pilot-plant quantities are available now.

If the properties of this new catalyst suggest that it might be useful to you in the preparation of urethane foams, elastomers, or coatings . . . get in touch with us. The more fully you can detail your requirements, the more helpful we can be in the preparation of data for you. So give us all possible facts. For prompt attention, address your inquiry to Department CO.

## Wyandotte CHEMICALS

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CW PHOTO—MORT SCHREIBER

Ciba's Allen (right) observes cell he developed for continuous electroorganic chemical reactions.

## Finding New Potential in Electroorganics

This week Minnesota Mining and Manufacturing Co. is finishing up a big new fluorochemical plant at Decatur, Ala. One of the largest U.S. electrochemical plants, the 3M unit will make low-volume, high-priced chemicals. Even larger electroorganic plants are in the offing—the payoff of new techniques for making high-volume, low-cost petrochemicals.

While electrochemistry is an historical tool for making commercial inorganics (e.g., caustic and chlorine), its use in organic production is comparatively recent. But it is catching on fast. Besides 3M's project Ciba Pharmaceutical Products, Inc. (Summit,

N.J.), for one, will use the electrochemical route in making a new drug (name still undisclosed). Ciba already uses the method in making Metapyrone, a new adrenal blocking agent, and Ecolid, for treating hypertension. For the latter compound, the intermediate N-dimethyl amino ethyl-tetrachlorophthalimide is electrochemically reduced to its isoindoline.

And early this year, Miles Chemical Co.'s Zeeland, Mich., plant started production of a new polymeric dialdehyde from starch (using electrolytically made periodic acid), expected to have wide use in plastics, tobacco binding, leather tanning.

And at least four principal oil companies are now believed to be racing to perfect electrolytic cells to make petrochemicals from petroleum fractions. Unlike conventional electroorganic chemicals, these would be low-cost products, ranging in price from 8-30¢/lb. (tonnage quantities).

**Premium Price Process:** The expected low cost of these petrochemicals is an eye-opener, even to veterans in electrochemical research. Milton Allen, head of Ciba's physical research labs—who will join Electro-Optical Systems (Pasadena) on Jan. 1 as director of the newly formed chemical research division—points out

## Electroorganic Chemical Reactions

Starting Material	Product
Azoxybenzene	Benzidine (dye intermediate)
3,4,5,6-Tetrachloro-N-(2-dimethylaminoethyl) phthalimide	4,5,6,7-Tetrachloro-2-(2-dimethylaminoethyl) isoindoline (drug intermediate)
Glucose	Mannitol
3-Acetylpyridine butanediol	2,3-bis-3-Pyridyl)-2,3-butanediol (drug intermediate)
Theophyllin	Desoxytheophyllin (drug)
Maleic acid	Succinic acid
Auramine	Leucauramine (dye intermediate)
3-Nitro-4-hydroxyphenylarsonic acid	Salvarsan (drug)
Nicotine	Nicotinic acid
Arabinose	Calcium arabinate (suspending agent)
o-Toluene sulfonamide	Saccharin
p-Aminoacetophenone	2,3-bis-(p-Aminophenyl)-2,3-butanediol (drug intermediate)
Chlorobenzene	Succinic acid
Anthracene	Anthraquinone (dye intermediate)
Furan	2,5-Dimethoxy-2,5-dihydrofuran (chemical intermediate)
Hydrocarbons	Fluorocarbons
Diketopiperazines	α-Aminoaldehydes (drug intermediates)
Mixture of aromatic ketones	Mixed pinacols (drug intermediates)
Monocarboxylic acids	High-molecular-weight paraffin hydrocarbons
Mixtures of carboxylic acids	Branched-chain fatty acids (similar to those found in nature, used in biological studies)
Steroids and alkaloids	Chlormethylation of steroids and anodic hydroxylation of various steroids and alkaloids is of interest in research on new drugs

that, traditionally, electrochemistry has displayed advantages primarily in fine-chemical synthesis. Conventional chemical processes for making organics for less than \$1/lb. may be more economical, says Allen.\*

Minnesota Mining's compounds, for example, may cost around \$6.50/lb. in some cases, although the price range is broad. It will make polytrifluorochloroethylene and other fluorocarbons in many physical forms—greases, oils, waxes, molding plastics—and for a variety of uses (e.g., Scotchgard-brand stain repellents for textiles). Startup of the new Decatur

\* Electro-Optical is strictly in research and development, does no manufacturing. It employs 260 staffers, had sales last year of \$1.6 million (higher this year). Established only four years ago, it is headed by A.M. Zarem, president, founder, and major stockholder. Zarem was formerly southern California manager and assistant director of Stanford Research Institute.

Its areas of effort have included electric propulsion, energy conversion techniques, including development of ultra-lightweight solar collectors, electronics systems, and the like.

and a platinum or carbon anode. The surrounding cell would hold the organic compound (dissolved in HCl) to be reduced, and a pool of mercury serving as a cathode.

Knowledge of electroorganic reactions dates back to 1830. Only in recent years, however, has the CPI done much to capitalize on it.

Improvements in cell design and capabilities, better methods of controlling reactions electronically, new awareness of organic reactions that are possible with the method account for this renaissance.

Traditionally, the method has been a batch operation. Now Allen has designed a continuous cell, still under development, that could cut production costs in half when scaled up. He recalls that early lab batch equipment operated at under four amperes and 15 volts, took minutes to reach stable operating conditions. Modern batch equipment develops 100 amps., and 250 v., stabilizes in a fraction of a second. Even power costs are down. In his new studies, Allen will use a \$6,000 electronically controlled silicon rectifier direct-current source. The electronically controlled dc. generator he previously used cost about \$14,000.

And membranes last longer now and are more efficient. Research by membrane suppliers such as Ionics, Inc. (Cambridge, Mass.) and Ionac Chemical Co. (Birmingham, N.J.), a division of Pfaudler Permutit, Inc., has resulted in superior membranes that are resistant to organic solvents, acids, alkalis, etc., while featuring good electrical properties. Composition of these membranes (e.g., synthetic fiber impregnated with cross-linked ion-exchange resin) is closely guarded by manufacturers. Applications, in turn, aren't often disclosed by customers who use the membranes for electroorganic chemical production. It's no secret, however, that Ionac supplies the membrane used in periodic acid manufacture for dialdehyde starch production.

The ideal (nonexistent) membrane should offer little resistance to passage of current, not clog in use, withstand elevated temperatures, be low in cost and have other attributes. There are still ample opportunities for research in this field.

**Action Plan:** The areas in which electroorganic chemistry can score are illustrated by the research areas



## In the heart of the Midwest a reliable source of formaldehyde

There are many good reasons why Hercules is looked to as a leading source for a dependable supply of formaldehyde.

For example:

- ① Hercules produces both methanol and formaldehyde at its centrally located Louisiana, Missouri, plant.
- ② Delivery is made when you schedule it—where you schedule it—whether it's overnight or in three months.
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For further information on how Hercules can serve your formaldehyde needs, contact your nearest Synthetics Department office or write direct to:

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## RESEARCH

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Allen will concentrate on at Electro-Optical. These include inorganic and hydrocarbon fuel cells, biochemistry, organic chemistry, electrochemistry (including electroorganic chemistry), radiation chemistry and chemical instrumentation development.

The firm's new electroorganic studies will take several forms. Fundamentals of electrode processes (kinetics, reaction mechanisms, etc.) get top priority. That's because much more must be known about how electroorganic chemical reactions proceed—not only to know how to produce useful compounds but also to develop fuel cells.

A major project involves development of continuous-flow electrochemical cells. Allen has used his present laboratory model in studies on the reduction of ketones and aldehydes (e.g., 3-acetylpyridine to pinacol). Future work will concern general oxidation and reduction reactions.

He will also push ahead in developing hormonal antagonists that are potentially valuable in adrenal gland disorders (e.g., Addison's disease) and as tumor inhibiting agents. The approach: synthesis of Amphenone-type (complex ketones or indenes) compounds that can be prepared only by using electrochemical techniques.

**Hush-Hush Area:** Many companies are not eager to talk about their electroorganic work. But work in this area is under way in a number of CPI firms that do not now boast commercial processes. Esso Research and Engineering Co. (Linden, N.J.), for example, has several staffers working on the method as a possible route to new organics, although Esso says this is on a limited scale.

Professor Sherlock Swan of University of Illinois says the method offers "great hope where catalytic methods are hard or impossible to use." Since the price of hydrogen is rising, electrochemical processes may become more economical in some areas, especially where power is cheap.

Swan says the Russians have done some "very interesting" work using a platinum or palladium black cathode to reduce triple and double bonds. The cathode—in a water solution or suspension—supplies the hydrogen through electrolysis. Swan believes more research should be done using cathodes other than lead.

Electrolysis of acetate solution to form hydrocarbons, for example,

proceeds best using a smooth platinum or iridium anode. With a gold, palladium, nickel or iron anode, efficiency of the reaction drops.

Fluorocarbon producers such as Du Pont and Allied's General Chemical division say they do not make any products electrochemically, but don't rule out some research interest. Union Carbide is working on fuel cells (CW, July 30, p. 28), a related field.

And some firms, however, that have a product list that might include electroorganically produced materials (Ethyl Corp., Columbia-Southern, Texas Instruments) disclaim any interest in this field at present.

Even those companies that readily admit to using electroorganic processing won't give out details now. But none discount its high promise, and there's little doubt the technique will play an increasingly significant commercial role.

### Self-Improver

A chemical pilot plant that automatically seeks to improve its product's quality will be set up at the University of Wisconsin (Madison) under a \$97,000 National Science Foundation grant. Unit will make its own changes in operating conditions based on statistical patterns worked out by George E. P. Box of the University's statistics department (and originator of the Box method of experiment design). The project is the joint responsibility of Box and Olaf Hougen, of the school's chemical engineering department.

### Propulsion Study Entry

Douglas Aircraft Co. (Santa Monica, Calif.) has formed a new subsidiary—Astropower, Inc.—to carry out research in new systems of propulsion, including nuclear, chemical and electrical types. Heading the new firm: Y. C. Lee, president; George Moe, vice-president and technical director; E. W. Smith, vice-president for administration—all formerly with Aeroflat-General Corp.

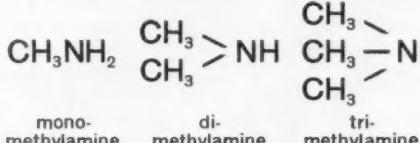
Plans for facilities are being drawn up and the new firm expects to employ about 100 technical people within a year. Among projects to be undertaken will be studies of ion engines, heavy-charged particle engines and thermal arc plasma engines.

## Facts you should know about Methylamines

If you are interested in exploring the possibilities of the methylamines or are already working with these useful intermediates, you will find valuable information in the above booklets. A large part of the material in these booklets stems from knowledge accumulated during Rohm & Haas' 26 years of experience in producing methylamines and supplying them to the chemical industries.

Anhydrous and aqueous methylamines are available from Rohm & Haas in quantities ranging from 5-pound cylinders to tankcars. To augment the information given in the booklets on methylamine storage and handling, Rohm & Haas offers technical service to meet your specific requirements.

Write, on your company letterhead, to Dept. SP-9 for your free copies of this useful literature.

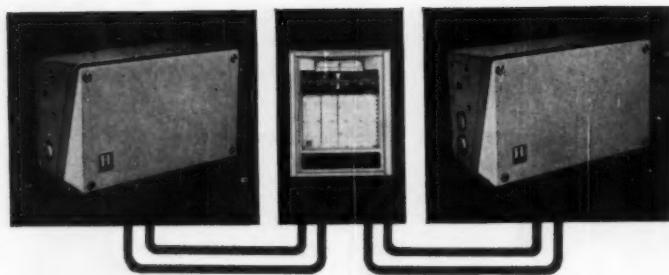


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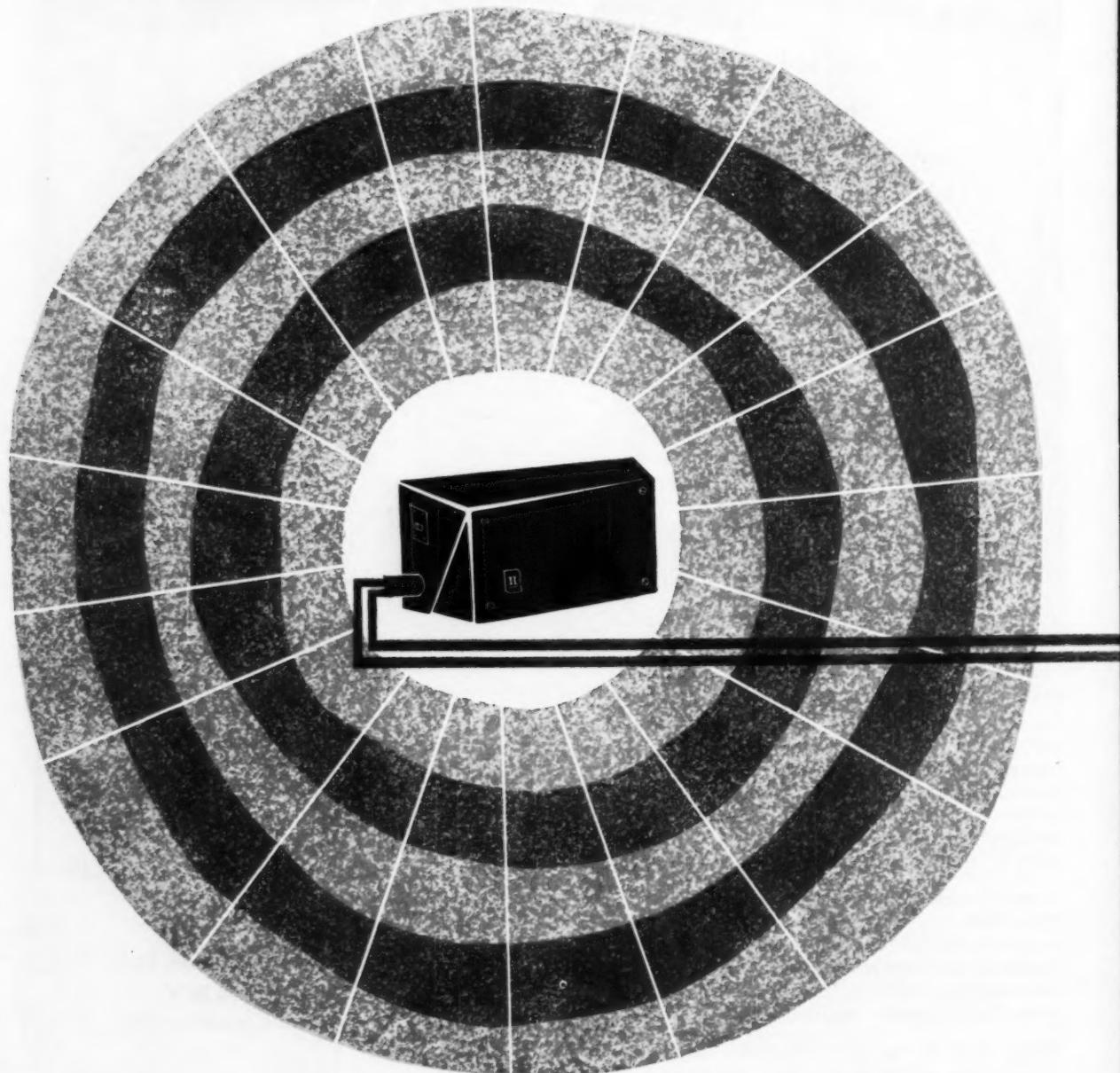
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# METHYLAMINES



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THE HEAT OFF  
FIELD-MOUNTED  
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The *ElectriK Tel-O-Set* System takes the heat off field-mounted instruments by *eliminating heat-generating tubes and power packs*. There's no external power required at any *Tel-O-Set* field-mounted instrument. The line power connection is made only at the receiver.

*Tel-O-Set* field-mounted instruments operate on a low calorie diet of 4-20 millamps . . . less than 0.6 watts. A simple two-wire line connects the field-mounted instruments with the control room. The two wires carry the control signal as well as the power. The d-c transmission avoids stray pickup and phasing problems . . . eliminates the need for shielding the line.

The 4-20 millamp signal range of the system gives a live zero and permits the use of the most reliable transistors available. These d-c signals can be fed into data handling systems and millivolt-actuated instruments . . . can be

easily transduced to a standard 3-15 psi pneumatic signal to operate existing pneumatic systems.

The basic circuit used in *Tel-O-Set* transmitters, receivers, controllers and other instruments has been thoroughly proved in thousands of applications in the last five years. This circuit uses a force-balance feedback system to increase the accuracy and the dynamic response of the system by decreasing hysteresis effects and sensitivity to changes in ambient conditions.

Take a new look at your control applications with the *ElectriK Tel-O-Set* System in mind! Get complete technical data from your local Honeywell field engineer. Call him today . . . he's as near as your phone. MINNEAPOLIS-HONEYWELL, 21 Penn Street, Fall River, Mass.

**Honeywell**



*First in Control*



## Chemical Peacemakers

Army sources last week disclosed their hopes to triple their spending within five years on development of bacteriological and chemical warfare agents. The emphasis would be on nonkilling chemical agents of the kind that leaves exposed persons helpless for a time without causing them permanent harm. These would be useful both in limited wars and in local emergencies (the Army's example: any possible overt action by Cuba against the U.S. Naval Base at Guantanamo).

Some of these incapacitating chemicals already have been developed. If Navy and Marine security forces at the Guantanamo Base do not already have some on hand, they could be supplied quickly, the source revealed.

The Army hopes to increase spending on bacteriological and chemical warfare research, development, and testing from a current \$70 million/year to \$76 million next year, and to about \$200 million in four or five years.

Defense against biological attack is also high on the Army's research program. Douglas Aircraft (see also p. 68) recently landed a \$661,000 contract for research and development of improved devices for the detection of biological contaminants in the air. Douglas anticipates that the warning system will be made up of sensitive detectors that will indicate the presence either of unusual numbers of microorganisms in the atmosphere or of varieties not usually present. Identification of the organisms would be a separate step. This program is an extension of studies conducted by the biological laboratories of the Army Chemical Corps at Fort Detrick, Md. The new contract provides for field evaluation of prototypes of detection devices designed at Fort Detrick.

## New Bug-Fighter Spray

A fabric-protecting spray that's non-toxic has been developed by Roy Pence of the University of California at Los Angeles. Key ingredients: antimetabolites (e.g., picolinic acid, 3-acetyl pyridine) that simulate vitamins and amino acids needed by the pests but which give them no nourishment. Result: they die of malnutrition.

Pence, who had previously reported research in this area (CW, Aug. 1, '59, p. 49), now says he has "perfected" the spray-form composition. Expected advantages of the antimetabolite approach are permanence, economy, nontoxicity and the fact that the pests will probably not develop resistance to antimetabolites as they have to many standard pesticides.

Cost of one effective formula is \$4/lb., enough to make 100 gal. of solution. Alcohol used for aerosol solutions would add to the cost, but a water solution would be useful for many applications.

## PRODUCTS

**Lure Makers:** Applied Science Laboratories (State College, Pa.) now offers ricinoleic acid and methyl ricinoleate of over 99% purity. They're for use in synthesis of the gypsy moth attractant, Gyplure, developed by the U.S. Dept. of Agriculture.

**Intermediates:** Fatty hydroxamic acids are now available from Woburn Chemical Corp. (Harrison, N.J.) for investigation or use in detergents, disinfectants, water repellants, etc.

**Biochemical:** Research quantities of melatonin (N-acetyl-5-methoxytryptamine) are now being supplied by Regis Chemical Co. (1219 N. Wells St., Chicago 10, Ill.). Compound has a strong neurohormonal function. Price: \$21/gm.

**Glass Tool:** Holmium-containing glass that transmits radiant energy in the ultraviolet region has been developed by Corning Glass Works (Corning, N.Y.). Identified as Corning Code No. 3130, it's for calibration of recording spectrophotometers for wave length accuracy.

## EXPANSION

- A multimillion-dollar, five-year expansion at Shell Development Co.'s Emeryville, Calif., laboratories has been completed. Shell has approximately doubled the size of its facilities, now has about 500,000 sq.ft.

- Pfaudler Co., division of Pfaudler Permutit Inc., confirmed its plans to build a \$750,000 research and development center in Henrietta, N.Y. (CW, Nov. 5, p. 106). The site is

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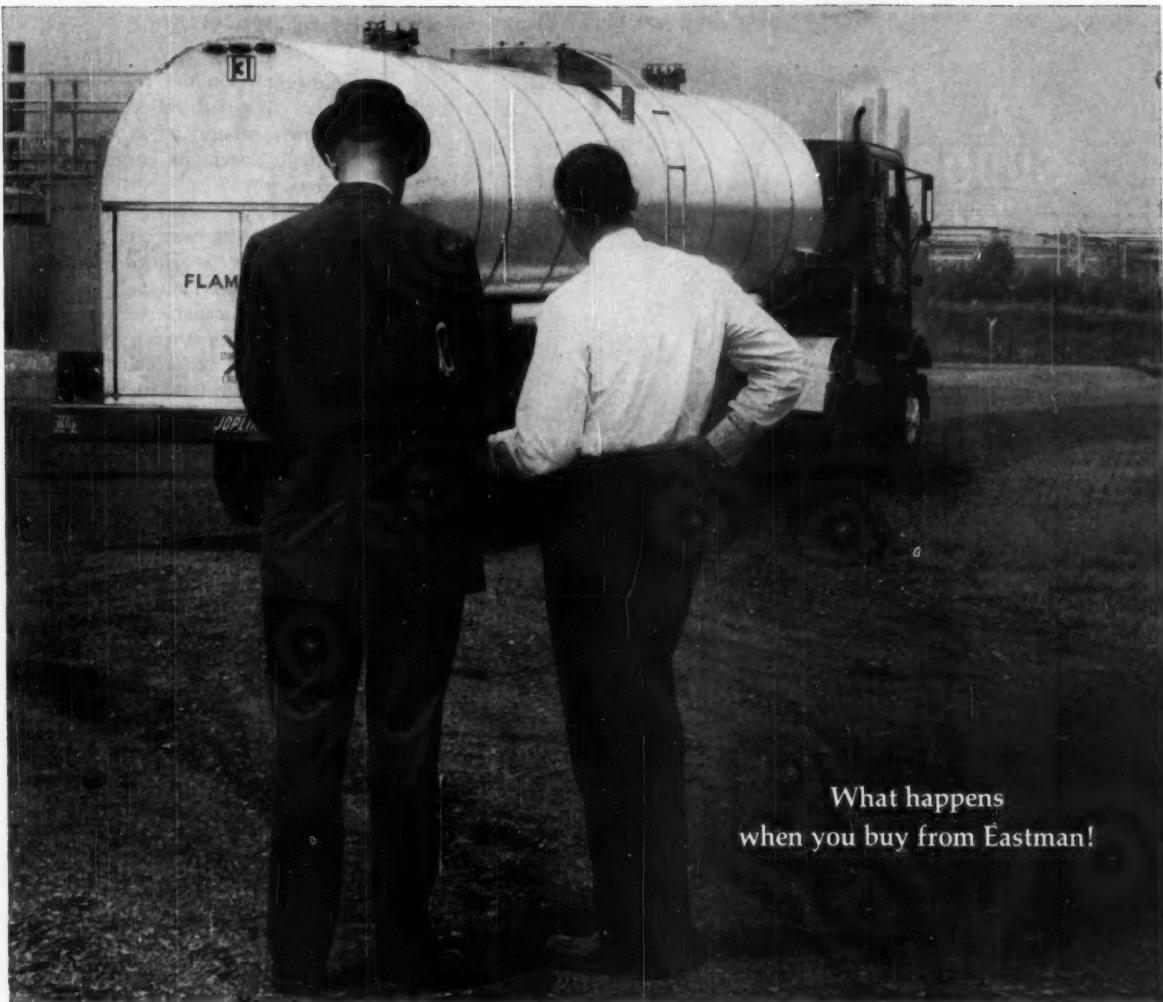
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For properties and shipping information on these and other Eastman products, see Chemical Materials Catalog, page 395, or Chemical Week Buyers' Guide, page 107.

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"Under normal circumstances, and from a customer with all his permits in order, a telephoned request for two tank trucks of SDA-2B Ethyl Alcohol, Monday morning delivery, is a pleasant way to add impressive pounds to a salesman's monthly tally sheet," reports one of our southwestern representatives.

"But, coming as it did at 9 o'clock on a Saturday night, my chances for setting any new sales records and his chances for getting the alcohol looked pretty slim.

"I promised to try...since the cus-

tomer had to have the alcohol or shut down an important process.

"Our plant switchboard operator in Longview, Texas gave me the home number of the Superintendent of the Alcohol Department and his babysitter in turn gave me the number where I could disturb his evening out. He was a little surprised to say the least, but sympathetic as only a production man can be when I explained the short inventory position of the customer, occasioned by an unusual demand for his end product.

"I'm still not sure of how he worked

out all the details, but I do know that overtime loading crews, bonded tank trucks, drivers, etc., were rounded up and on hand Sunday morning. With an able assist from the cooperative Alcohol Tax Division the all-important shipment left Longview late Sunday afternoon and was unloading at the customer's plant at 8:00 A.M. on Monday morning."

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**West Coast:** Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

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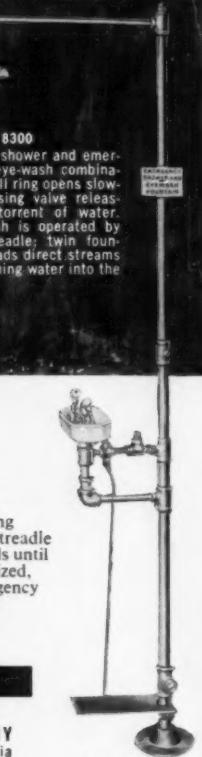
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## RESEARCH

contingent upon the rezoning of an 85-acre location selected by the company, where it also hopes to eventually locate its corporate headquarters.

• Northrop Corp.'s Norair Division has opened its new Advanced Research Center at Hawthorne, Calif. Included: a magnetogasdynamics research engine capable of accelerating ionized particles to high velocities to provide thrust; cryogenic equipment for liquefying helium for use in space propulsion studies; and an 87-ft. steel "zero gravity" tower for investigating the action of liquids and gases in controlled free fall for clues to their behavior in the weightlessness of space flight.

• Coleman Instruments, Inc. (Maywood, Ill.), has completed the purchase of Delmar Scientific Laboratories (Chicago). Delmar, precision glassware fabricator, will be a subsidiary of Coleman Instruments.

## LITERATURE

• "Reducing the Incendivity of Permissible Explosives by Sodium Chloride" can be obtained from the Publications-Distribution Section, Bureau of Mines, 4800 Forbes Ave., Pittsburgh 13, Pa. The report describes studies of the effects of varying proportions of fine and coarse salt in cooling the flames emitted by explosives, thus lessening their chances of igniting gas or coal dust.

• "Current Contents of Space and Physical Sciences" will be a new publication (starting Jan. '61) of the Institute for Scientific Information (1122 Spring Garden St., Philadelphia 23). It will be a weekly listing (in English) of the contents of more than 425 scientific journals which publish an estimated 110,000 articles each year.

• The Chemical Society (London) has published Volume 56 of its "Annual Reports on the Progress of Chemistry," which covers '59. Price: \$5.60.

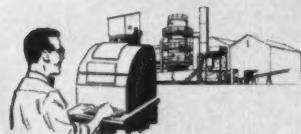
• "Soviet Research on Complexes and Coordination Chemistry," a translation of 372 Russian articles written during '49-'57, will be published this month by Consultants Bureau Enterprises, Inc. (227 West 17th St., New York 11). It will be available in five volumes, priced from \$37.50 to \$65 each, or complete for \$200.

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# SOURCE n-BUTANOL iso-BUTANOL

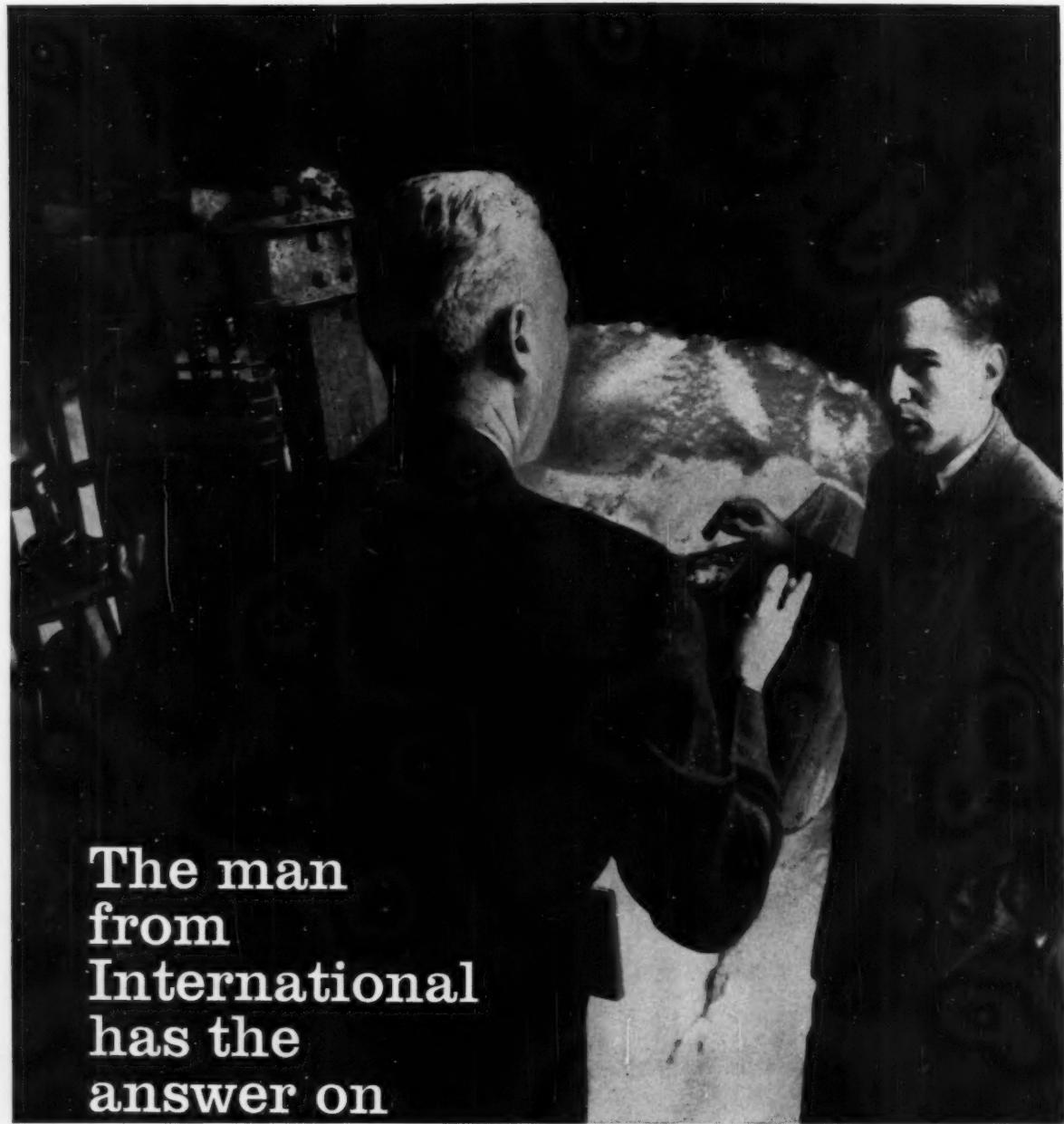
Dow Badische is a new company owned jointly by The Dow Chemical Company and Badische Anilin und Soda Fabrik, Overzee, N.V. Dow Badische, initially operating in the field of acetylene chemistry, unites American and European production and research know-how and couples them with American marketing skills. These new alcohols are the first developments for other product lines.

For more information, write to The Dow Chemical Company, Midland, Michigan.

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## STEEL

	1959 Thousands of tons	Value (est.) Thousands of dollars	1970 (est.) Thousands of tons
Oxygen	1,430	\$28,000	3,000
Acids	880	22,530	1,020
Lime	1,200	22,000	3,000
Alkalies	44	15,700	57
Ammonia	25	2,200	...
Metal-plating chemicals	10	2,865	11.5
Paint (for production and maintenance)	16	4,000	18.5
Oil (non petroleum)	40	10,000	50.0
Others	115	16,104	...
Other gases	...	...	50.0
Other chemicals	...	...	127.0
Plastics	...	...	?
<b>Total</b>	<b>3,760</b>	<b>\$123,399</b>	<b>7,334+</b>

## Hungrier for Chemicals

**The encouraging outlook for chemicals used in metals production is shown in the tables on this and the following pages.**

Attention was concentrated on the giant metal industries last week, as the Chemical Market Research Assn. probed the types and volume of chemicals these industries swallow up each year. More than analyses of present markets, the studies show where and how much these chemical applications will fare in the next decade—and for the most part, it is encouraging news.

As the charts show, the two largest chemicals users in the primary metals field, steel and aluminum production, are expected to double their annual take of chemical products by '70. But other metals industries are also pointed toward growth, and chemical makers seem sure to benefit. Here's the industry-by-industry rundown.

**Hungry Steel Giant:** The manufacture of steel (excluding chemicals used in mining, coke-oven activity, steel fabrication and transportation) was probed by J. S. Doerr of U.S. Steel Corp. He told the 240 CMRA members and guests that the steel industry consumed over 3.7 million tons of chemicals—worth more than \$123 million—in '59. This was about 2%

of the total steel industry purchases of \$6.4 million last year.

Largest-volume and fastest-growing chemical used is oxygen. Last year an estimated 1.4 million tons were consumed. Over half went for steelmaking (principally in open-hearth furnaces); about 13% went into blast furnace operations; 23% for scarfing operations (use of oxygen to clean up the surface of steel), with the rest going for burning and welding uses.

The open-hearth operation has been the major growth area for oxygen because it trims the time needed to produce a "heat" of steel. Doerr expects oxygen demand in the steel industry to double during the next 10 years, hit about 3 million tons/year. But wider use of oxygen in blast furnaces—possible with more economical oxygen—could dwarf even the most optimistic forecasts, Doerr says.

Second-largest chemical consumed is lime, used mainly to remove sulfur and phosphorus. The steel industry took 1.2 million tons in '59, will take about 3 million by '70. About 71% of lime goes for open-hearth opera-

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think of the savings in process development costs.

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## ALUMINUM

Process	Material	Aluminum Pounds/ Short Ton of Primary			Yearly Consumption (Millions of lbs.)
		'60	'65	'70	
<b>Bayer Process</b>	Caustic soda	108.0	221.4	367.2	513.0
	Soda ash	203.4	417.0	691.6	966.2
<b>Electrolytic Reduction Process (Hall)</b>	Calcined petroleum coke	770.0	1,578.5	2,618.0	3,657.5
	Coal tar pitch	333.0	682.7	1,132.2	1,581.8
	Cryolite	50.0	102.5	170.0	237.5
	Aluminum fluoride	60	123.0	204.0	285.0

Note: Approximately 2 tons of alumina are required to produce 1 ton of aluminum.  
Source: Arthur D. Little

## MAGNESIUM

Material	Yearly Consumption (Millions of lbs.)		
	'60	'65	'70
Chlorine	74.71	102.58	111.52
Ferrosilicon	15.16	34.66	56.32
Dolomite	165.06	377.28	613.08
Fluorspar	2.25	5.14	8.35

Source: Arthur D. Little

tions, with 22% for the basic oxygen process. Electric and blast furnace applications take the rest.

Of the 880,000 tons of various acids consumed in '59, about 94% (830,000 tons) was sulfuric acid. Steelmakers also took sizable quantities of hydrochloric, nitric, hydrofluoric and phosphoric acids. Practically all were used in pickling and conditioning operations. By '70, acid demand will increase an estimated 23%, to 1.02 million tons/year.

**Step by Step:** Doerr also pinpointed the specific chemical requirements of the various steps in steelmaking. Two of these, ore reduction and steel refining, account for the largest share of the chemicals consumed (about 2.01 million tons in '59). Oxygen (at 1.09 tons) and lime (900,000 tons) are the key products in terms of tonnage. These processes account for about 35% of the total dollar value.

A later stage of steelmaking—hot forming—consumed 365,300 tons of chemicals in '59. Oxygen (340,000 tons) and acetylene (8,000 tons) accounted for the major portion. Both products are used in scarfing of the

steel slabs. Yearly acid consumption at this stage is about 10,000 tons. Of this, nitric accounts for 6,000 tons; hydrochloric, 3,000; others, 1,000.

Chemical consumption in cold-forming and finishing operations account for only 28% (1,043 million tons) of the industry's requirements. But this 28% represents about half of the total spent for chemicals by steelmakers.

The major quantity of sulfuric acid is consumed at this point, with consumption of other acids also high (hydrochloric at 25,000 tons; nitric, and hydrofluoric, 5,500 tons each; and other acids, 7,500 tons).

Annealing of cold-rolled sheets is usually carried out in a controlled atmosphere of nitrogen or hydrogen—gases now produced by the dissociation of ammonia. Ammonia demand here is about 25,000 tons. But by '70, ammonia requirements will be nil. Reason: wider availability of nitrogen from oxygen plants makes it likely that this source will replace the ammonia (*CW*, Aug. 6, p. 53).

The expected doubling in chemical requirements by the steel industry by

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As for its action, one group says it is purely physical, operating under such laws as capillary attraction and surface tension. Another group maintains the phenomenon is based on chemical and electrochemical action.

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## BERYLLIUM

Materials	Yearly Consumption (Tons)		
	'60	'65	'70
<b>ACIDS &amp; BASES</b>			
Sulfuric acid (66° Be.)	3,570	5,730	9,000
Ammonia	120	180	280
Caustic soda	5,270	8,330	13,070
Soda ash	1,050	1,750	2,670
Hydrofluoric acid	860	1,590	2,940
<b>METAL &amp; METAL OXIDES</b>			
Lead dioxide	85	180	250
Magnesium	250	450	840
Copper (massive)	3,900	4,600	5,400
Copper powder	420	490	580
<b>SALTS</b>			
Sodium silicofluoride	1,800	2,820	4,460
Ferric sulfate	2,000	3,130	4,940
Ammonium sulfide	60	110	185
Ammonium bifluoride	410	753	1,367
Ammonium persulfate	57	110	200
<b>Miscellaneous</b>			
Chelates	234	418	618
Carbon powder	140	160	190
Beryl (10% BeO)	8,140	13,240	20,125

Source: Arthur D. Little

## URANIUM ORE PROCESSING

Chemical	Average Consumption (Tons/ton of Uranium)	Estimated Annual Consumption
Sulfuric acid	53.5	820,000 tons
Caustic soda	0.22	3,300 tons
Sodium chlorate	1.3	20,000 tons
Polyacrylamides	0.04	550 tons
Anion exchange resins	0.005	2,500 cu.ft.
Amines or esters	0.01	50,000 gals.
Kerosene	0.13	600,000 gals.
Alcohols	0.005	25,000 gals.
Chlorides (as NaCl)	0.71	11,000 tons
Nitrates (as NH <sub>4</sub> NO <sub>3</sub> )	0.46	7,000 tons
Soda ash	0.26	4,000 tons
Magnesia	0.02	360 tons
Ammonia (as NH <sub>3</sub> )	0.03	550 tons

'70, said Doerr, will come because the chemicals/ton of steel ratio will rise; steel output will increase also, about 30% over the '60 rate. The trend toward lighter-gauge steel products will be one important factor in pushing the chemicals/ton of steel ratio higher.

**Aluminum Moves Up:** Rapidly growing demand for aluminum will

more than double the chemical requirements of this industry by '70, according to R. W. Hyde, H. W. Flood and E. A. Woods, all of Arthur D. Little, Inc. With the industry operating at about 85% of its 2.5-million-tons/year capacity, output is expected to top the 2-million-tons/ mark in '60. Metal consumption by '67 will hit about 4 million tons and

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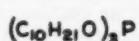
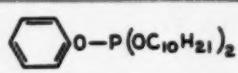
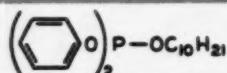
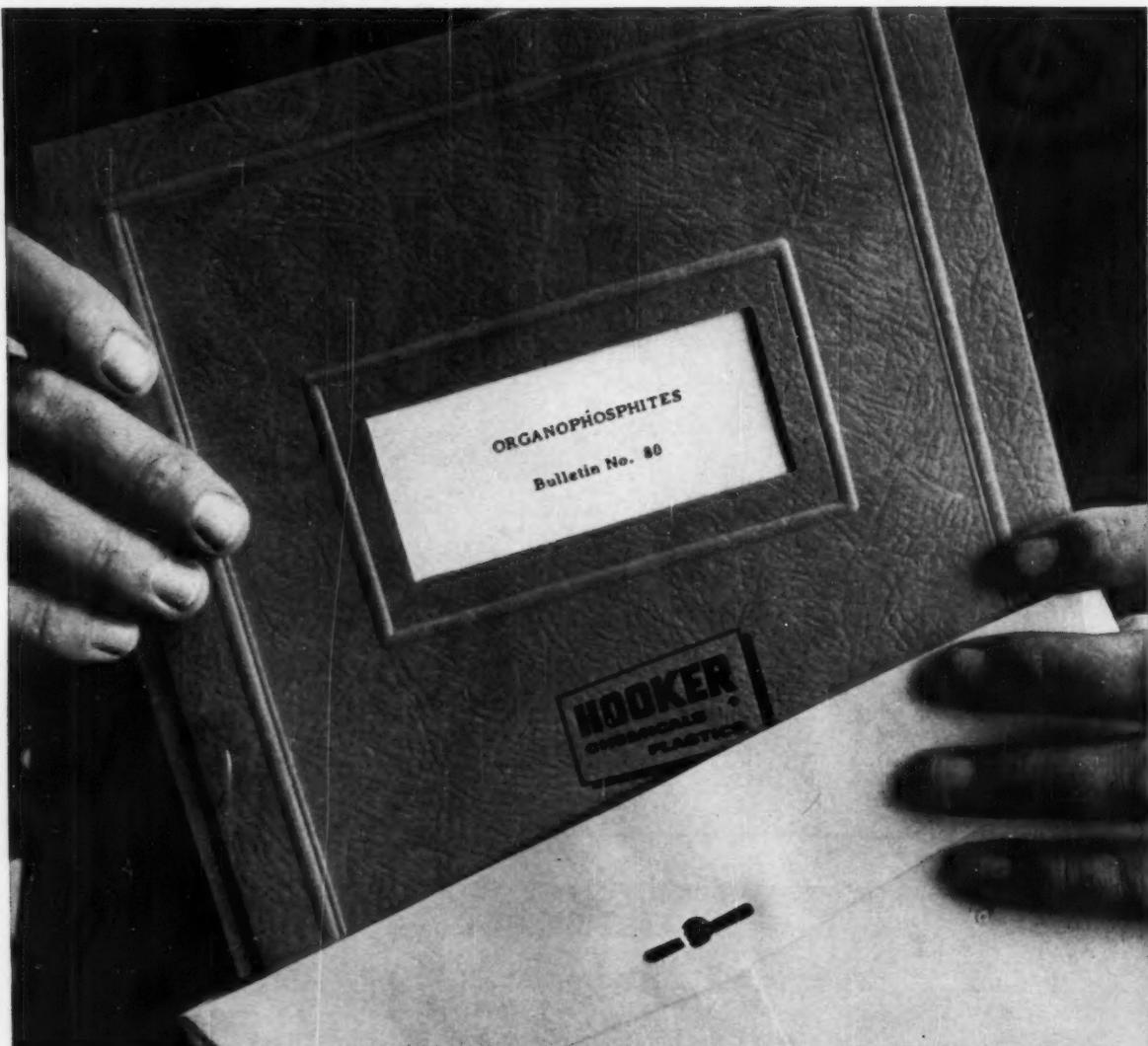
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The bulletin covers in detail triphenyl phosphite, diphenyldecyl phosphite, phenyldidecyl phosphite, and tri-decyl phosphite.

Chemical properties and specifications, typical reactions are included in its contents. Applications in alkyd, vinyl,

polyester, and epoxy resins and as stabilizers in other products are also discussed. It concludes with a two-page bibliography on the pertinent literature available.

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## URANIUM METAL PROCESSING

Chemicals Used In Converting Uranium Concentrates  
To  $UF_6$  And Metal

Chemical	Consumption (Tons/ton of Uranium)
Nitric acid (56%)	0.96
Lime	0.38
Aluminum hydrate	0.01
Tributyl phosphate	0.01
Hexane	0.01
Soda ash	0.05
Caustic	0.02
Sulfuric acid	0.02
Ammonium sulfate	0.001
Ammonia (as $NH_3$ )	0.12
Hydrofluoric acid (as HF)	0.58
Magnesium metal	0.21

could hit 7 million tons/year by '75.

If aluminum follows the predicted growth pattern and the present aluminum processing methods dominate through the next decade, Hyde and his associates believe the growth in chemical consumption will double (table, p. 81).

In addition, some aluminum producers that once made their own hydrogen fluoride and aluminum fluoride are now purchasing them (CW, March 26, p. 101).

**More Magnesium:** Magnesium output in the '60s, an estimated 60,000 tons, will be made in two ways: the sea-water technique and the silico-thermic (Pidgeon) process. Dow extracts the metal from sea water at its Freeport, Tex., plant; Alabama Metallurgical Corp., a new producer, has a silico-thermic unit at Selma, Ala., and New England Lime Co. has a similar unit at Canaan, Conn.

Dow's process currently dominates the magnesium scene; it will probably continue to do so as the U.S. output climbs to about 125,000 tons by '70. The silico-thermic process will likely contribute about 10,000 tons/year. The chemical needs to match industry growth are shown on p. 81).

**Beryllium Growth:** During the next five years beryllium consumption will almost double, then move up to about 570,000 lbs./year by '70. Currently, there are two domestic producers of beryllium: Beryllium Corp. and Brush Beryllium, each using a different process. Beryllium uses the Copeaux-Kawecki process (fluoride route), and

Brush Beryllium Co. uses the Sawyer-Kjellgren process (sulfate leaching route). The chemical consumption projections (p. 83) assume that the growth of beryllium will be distributed between these processes in the same proportion that exists today.

**Nuclear Metals Growth:** Chemical consumption in the production of uranium was covered by J. U. Shepardson and A. E. Ruehle (Mallinckrodt Chemical Uranium Division). In the next six years, they estimate, AEC will buy an average 26,000 tons/year of triuranium octoxide,  $U_3O_8$ . Of this, 18,000 tons will be produced in the U.S., 4,500 tons in Canada, 3,500 tons overseas. Although Canadian production will use some chemicals from the U.S., only domestic output enters into the estimates shown.

Of the 8.1 million tons/year of ore (0.24% assay  $U_3O_8$ , 93% recovery) about 80% will be recovered by sulfuric acid leaching. With acid consumption about 250 tons for each ton of ore treated, about 820,000 tons/year of sulfuric acid will be needed.

Other chemicals used in uranium consumption are shown above.

The huge volumes of chemicals consumed in these specific industries are only a fraction of those used in the entire metals industry. And this does not include chemicals such as explosives and plastics that are used in mining or final fabrication steps. But there is enough evidence to prove that chemicals stand to grow healthily with the nation's rising consumption of primary metals.

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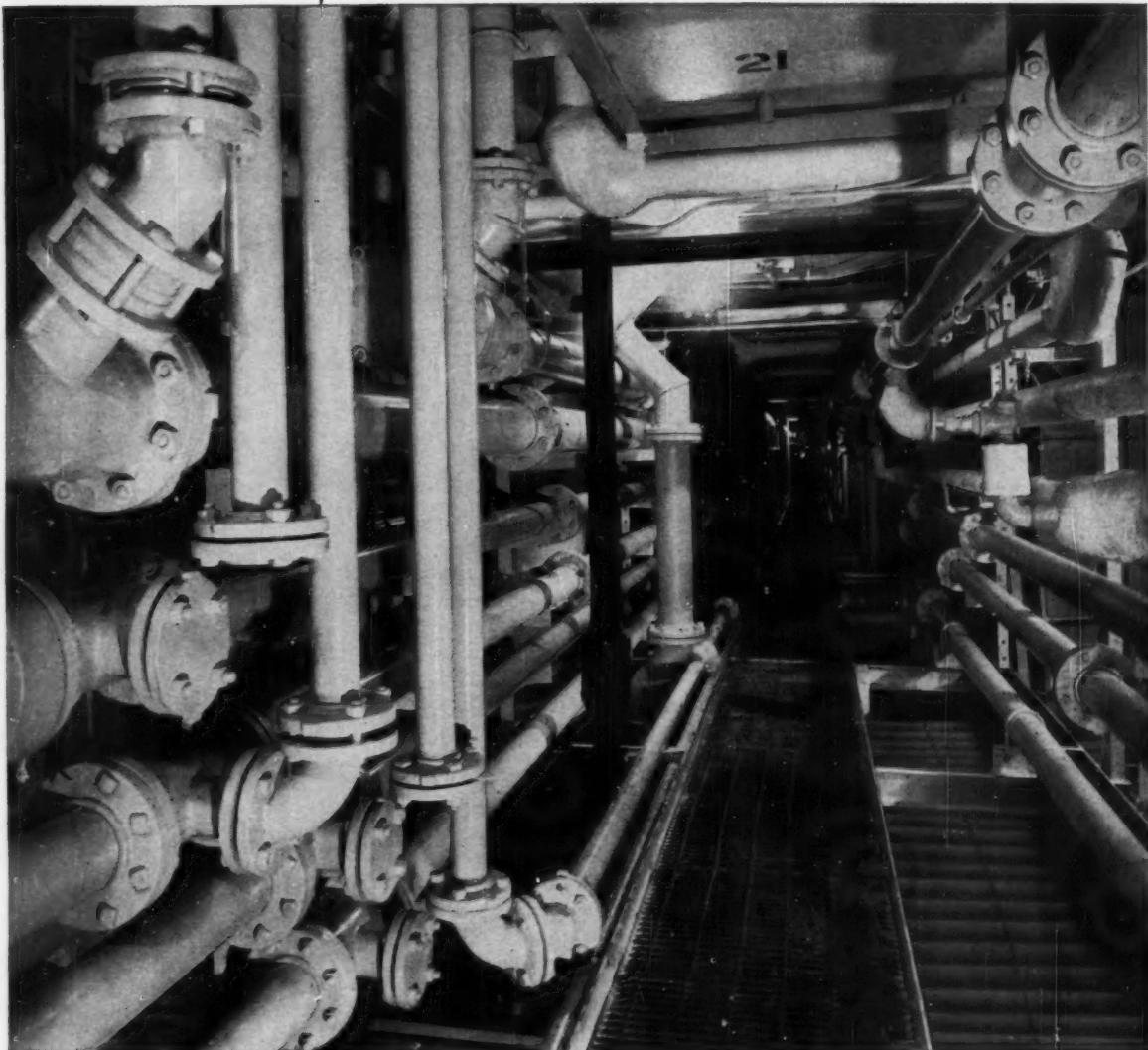
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The installation shown above carries hot sulphuric acid and other chemicals used in Industrial Rayon's Continuous Process method of making tire cord. This Saran lined supply and return piping, serving all of the plant's spinning machines, carries the solutions from lower levels to spinning machines on the main floor. Pumping pressures range from 45 psi upward, and solution temperatures are above 125° F.

The Saran Lined Pipe was installed in 1953 and has been in continuous use since. Maintenance costs have been extremely low and I.R.C. engineers report that, during these six years, Saran Lined Pipe has performed dependably under their corrosive operating conditions.

Whenever dependable piping systems are required, whatever the degree of corrosion or chemical activity, consider Saran Lined Pipe. Saran Lined Pipe, fittings, valves and pumps are available for systems operating from vacuum to 300 psi, from below zero to 200° F. They can easily be cut, fitted and modified in the field without special equipment. For more information, write Saran Lined Pipe Company, 2415 Burdette Avenue, Ferndale, Michigan, Dept. 2282AM11-19

See "The Dow Hour of Great Mysteries" on TV.

**THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN**

# Market Newsletter

CHEMICAL WEEK  
November 19, 1960

**Another bombshell hit the synthetic latex field this week**, this one being set off by leading styrene-butadiene maker Dow Chemical Co. Dow says it will drop tabs 2¢/lb. across the board on all but a few special styrene-butadiene latex products. New quotes in tank-car quantities: 27.5¢/lb.

At press time, most companies contacted by *CW* had not had time to decide whether or not to follow suit. However, they will likely have to match these prices.

The move, according to Dow spokesmen, reflects lower raw-material costs, at the same time is intended to increase penetration of such markets as paints, paper, packaging and building products.

More likely, however, the lower tabs are intended to offset recent price reductions on acrylates (*CW Market Newsletter*, Nov. 5). Rohm & Haas slashed tabs on ethyl acrylates by 1 1/4¢/lb., bringing tank-car prices to 32 1/4¢/lb. Other producers, Celanese, Dow and Union Carbide followed. Big question now: Will the new price drop on styrene-butadiene precipitate further price reductions by acrylate producers?

**Two major sodium chlorate construction projects** have been completed by American Potash & Chemical Corp. Last week the new expansion at the firm's Aberdeen, Miss., plant went onstream. The new facilities raised capacity 50%, from 15,000 tons/year to 22,500 tons/year. At Henderson, Nev., work on an extensive modernization program, involving replacement of the sodium chlorate recovery system, was completed. Estimated capacity: 28-30,000 tons/year. Sodium chlorate is a starting material for ammonium perchlorate and is used in paper and pulp manufacture, uranium ore processing and agricultural chemicals.

**Add another producer to the nylon ranks.** Firestone Synthetic Fibers Co. has started production of nylon filament for tire-cord use at its Hopewell, Va., plant. Output will include both monofilament and multifilament nylon yarns, which will be further processed to tire cord. Capacity: 10 million lbs./year.

With the opening of this new division, Firestone becomes the first U. S. rubber company to produce its own nylon filament. Possibility of selling to outside customers has not been discounted by Firestone, although it will take care of its own requirements first.

**East Texas' first unit for recovery of sulfur from natural gas** is now operating in Franklin County's New Hope fields, nine miles from Mount Vernon. Cycling 50 million cu. ft. gas daily from the Smackover formation 12,000 ft. below, the new unit can recover 323,000 gal./day of gas liquids and 220 tons/day of sulfur. Tidewater Oil Co., a 43%

# Market Newsletter

(Continued)

holder in the venture, operates the plant. Texaco Inc. also owns a substantial share of the project.

Smackover gas is high in hydrogen sulfide, which must be stripped before it can be used commercially. Numerous Smackover fields in Eastern Texas have been faced with this problem. The New Hope plant could provide a key operation in future exploitation of this type of formation in East Texas.

**Plywood producers continue to cut back on production** in an attempt to hold the current price line. Latest example: Evans Products Co. (Plymouth, Mich.), which completely shut down its Roseburg, Ore., unit for 10 days to keep plywood output more in balance with demand. Operations were resumed early this week.

Earlier this year the company, along with others in the field, had cut back operations of all its plywood plants to 68% of capacity (*CW Market Newsletter, Oct. 15*).

**Polycarbonate prices are due for another trimming**, the second this year. General Electric Co. will slash prices up to 41%, lopping off as much as 25¢/lb. on some resins (new price of standard-grade material will range from \$1.30 to \$1.75/lb). The company is also eliminating normal freight charges and will allow more liberal aggregation terms. Mobay, only other producer in this field, says it will match the new tabs, which will go into effect Dec. 10.

GE's price cut is tied to the recent startup of its commercial plant at Mt. Vernon, Ind. (*CW, Sept. 24, p. 78*). Earlier this year Mobay dropped tabs 32% when it started operations at New Martinsville, W. Va. (*CW Market Newsletter, July 9*).

**U. K. prices for acetic acid are cut 7½%** by the Chemical Division of The Distillers Co. New tabs affect only domestic sales, since exports are only a small part of the company's operations. Last June the company reported it would build a \$5.8-million unit at Hull, England, to make acetic acid via its exclusive one-stage oxidation process using a light petroleum fraction.

## SELECTED PRICE CHANGES—Week Ending November 14, 1960

	Changes	New Prices
UP		
Cocoa butter, bgs.	\$0.01	\$0.65
Cottonseed oil, crude, tanks	0.00125	0.1025
Tall oil, refd., tanks, works	0.005	0.0575
Tung oil, tanks	0.005	0.245
DOWN		
Corn oil, crude, tanks	\$0.01	\$0.145
Cubeb oil, cns.	3.00	9.00
Tallow fatty acid, hydrog.	0.0025	0.1425

All prices per pound unless quantity is quoted.

# Quality



My name's Nosey. I'm the Esso Solvents Expert. And I'm illustrating the fact that Varsol's odor is *down* and its quality *up*.

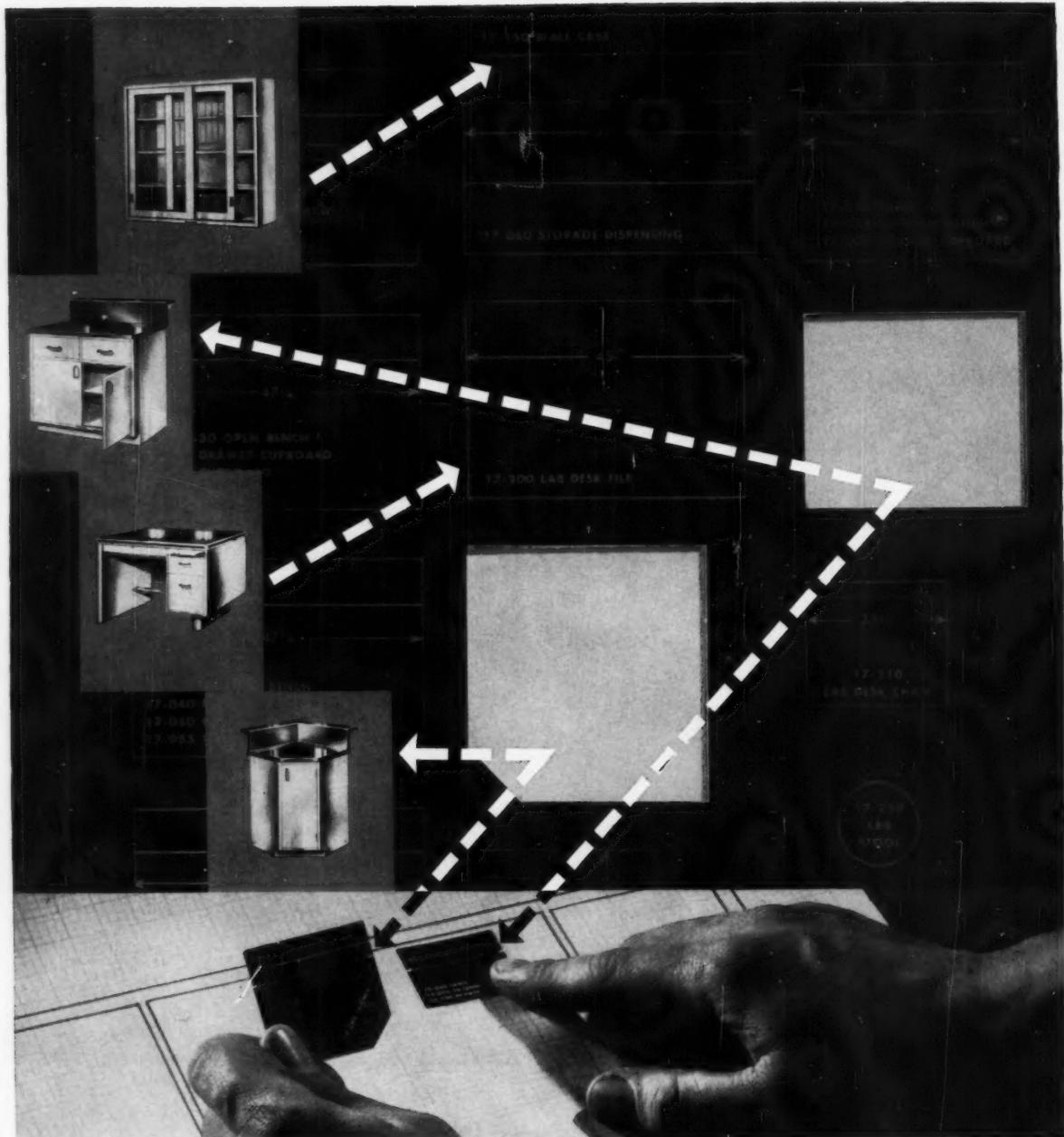
As you know, odor is hard to control without sacrificing solvent power. That's why Esso has been researching low odor for years. Fact is, we have an Odor Panel composed of experts in all of our refinery and research establishments. These people are dedicated to the continuing improvement of "low odor" Esso Solvents.

Constant research makes it possible to deliver our solvents fresh and uncontaminated from modern, conveniently located terminals. For further information, contact your nearest Esso office or write: Esso Standard, Division of Humble Oil & Refining Company, 15 West 51st Street, New York 19, N. Y. And tell 'em Nosey sent you!



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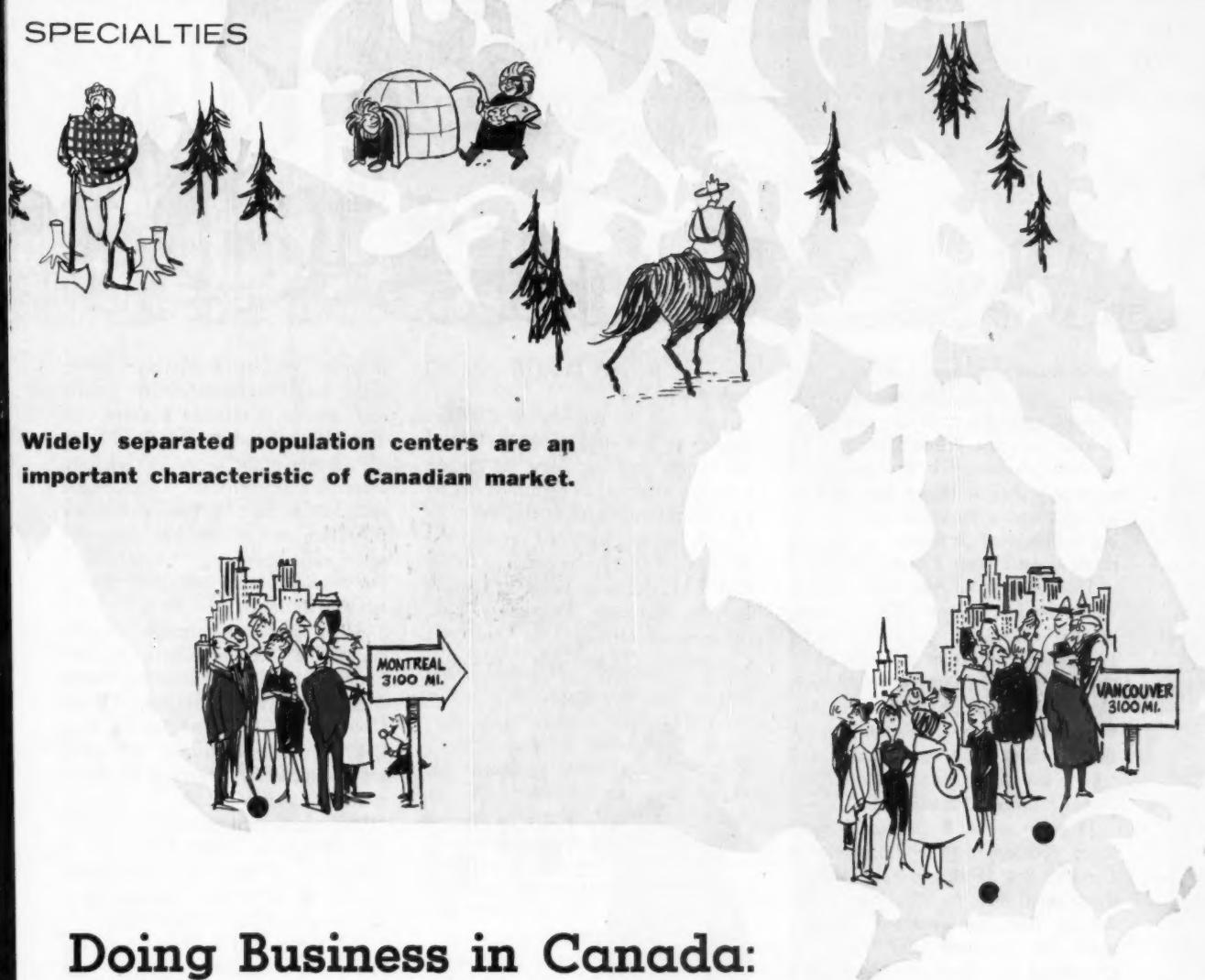


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## SPECIALTIES



# Doing Business in Canada: Always Tough, Getting Tougher

ILLUSTRATIONS—BOB WEBER

A few weeks ago, representatives of many U.S. specialties companies traveled to Montreal for the third annual convention of the Canadian Manufacturers of Chemical Specialties Assn. This year's trip north drew more interest than ever before, and the explanation is simple: Canada, a market almost taken for granted by U.S. exporters of specialty raw materials and finished products, is beginning to declare greater economic independence.

For U.S. companies, this nascent nationalism holds disturbing potentialities. Canada has been regarded by some as virtually another American state; it has for years been dominated by subsidiaries of U.S. companies. The prospect of a change in this chummy status will require a sober re-evaluation of Canada. Of course re-eval-

uation may not be necessary. There are Canadian reassurances that no big changes lie ahead. Nevertheless, U.S. specialties makers are now taking a long, hard look at the market across the northern border.

**Tariffs Issue:** Chief reason for a reappraisal is Canada's upcoming revision of its chemicals tariff. The review, Tariff Reference No. 120, is being made in the hope of finding remedies for some of Canada's present chemical industry maladies—declining chemical profits, larger U.S. investments, widening imbalance of trade with the U.S.

The current investigation, which began in September, will result in the first overhaul of the chemicals tariff since it was established in 1906. Over the past half century chemical advancements such as coal-tar dyes and

pigments, silicones, alkyd finishes, fuel additives, many agricultural chemicals, etc., have been recognized only by a piecemeal adjustment of that elderly tariff.

Although changes are clearly needed, Canada's Tariff Board estimates that as many as 40 public hearings will be necessary to achieve real improvement. And these would carry the review into 1962. In any case, it seems certain that no new tariff schedule will be in effect for several years.

**Diverse Interests:** Nevertheless, Canadian specialties companies are already voicing their views to the Tariff Board and these remarks are drawing attentive U.S. ears. One thing already clear: Canadian specialties makers are by no means unanimous in how the tariff should be revised.

Partly, this is because the industry



there is composed of both raw material suppliers and manufacturers of end-use specialty products—naturally diverse interests. While a supplier of a basic material, for example, may want a higher tariff on the product he produces, a manufacturer importing semifinished or finished goods for resale doesn't want a higher duty.

This can be confusing to U.S. firms with Canadian interests. For example, Stepan Chemical Co. (Northfield, Ill.) exports sulfonates and sulfates to Canada in small volume; and although Canada is not a prime market now, Stepan has hopes of expanding activities there. The expansion could take place under present tariffs; but higher rates could rule it out.

In some cases, higher tariffs may force companies to build plants in Canada. But in the case of a relatively small firm, such as Stepan, the volume does not warrant building there. On the other hand, Polyvinyl Chemicals, Inc. (Peabody, Mass.) (also small), which pays duties on some but not all of its polymers (for floor waxes, shoe dressings), favors building a Canadian plant no matter what happens to tariffs. It believes the Canadian market is growing; and to maintain its share of it, the company must build its own facilities.

**Industry Profile:** The estimated \$400-450-million\* Canadian specialties industry is more than 70% controlled by U.S. companies. A glance at the membership roster of the Canadian Manufacturers of Chemical Specialties Assn. (CMCS) or a quick tour through any Canadian supermarket, drug or department store selling specialties is telling proof of this. The only other foreign country to exercise any noteworthy control in the specialties field is Britain. (Canada's giant Canadian Industries Ltd. is 80%

owned by Britain's Imperial Chemical Industries Ltd.)

The youngest segment of Canada's specialties industry, aerosols, is also the fastest growing. Some 25 million units are expected to be turned out by Canadian custom fillers this year, although aerosols have not yet won the public's favor there as much as in the U.S. The five main fillers in Canada include Aerocide Dispensers Ltd. (with about 60% of the business), Connecticut Chemicals (Canada)

subsidiaries—Procter & Gamble, Lever Bros., and Colgate-Palmolive. Fourth and smaller is Canada Packers Ltd. The U.S.-controlled companies operate autonomously, maintain their own research and product development staffs. Familiar U.S. brandnames are dominant in Canada, but there are some exceptions—e.g., Lever sells a powdered laundry detergent, Extra, not sold in the U.S.

Other Canadian detergent producers include Beaver Products Co. Ltd., Majestic Soap Ltd., Consumer Industries Ltd., Myriad Detergents, United Chemical Co. Ltd., and Success Wax Ltd. Nonionic industrial detergents are produced by Chemical Developments of Canada Ltd.

The main manufacturer of detergent alkylate is Imperial Oil Ltd., a subsidiary of Esso. Key phosphates supplier is the British-controlled Electric Reduction Co. of Canada Ltd.

For waxes and floor polishes, the best-selling consumer brands are products by S. C. Johnson, Simoniz and Success Wax, a Canadian firm. The main U.S. companies supplying materials include Rohm & Haas, Polyvinyl Chemicals, Borden, and UBS Chemical.

In the automotive chemical sector the same companies compete as in the U.S.—Union Carbide, Dow, Bardahl, Simoniz, R. M. Hollingshead and Tumbler, for example.

The major basic producer of insecticide chemicals is Naugatuck Chemicals, a division of Dominion Rubber (subsidiary of U.S. Rubber), while consumer brands are manufactured by Sherwin-Williams, Diamond Alkali, Dow, Rohm & Haas, Union Carbide, and Monsanto. (All pesticides are duty-free.)

Largest in the disinfectant and sanitizer field is a Canadian company, G. H. Wood & Co. Ltd. (Toronto). There are a number of smaller firms—W. J. Bush & Co. (Canada) Ltd.,



#### Large French-speaking population poses labeling problems.

Ltd., Aerosol Packaging of Canada Ltd., Pentagon Chemicals, and John Struthers & Co. Ltd. Two marketers, Boyle-Midway and Nestle-Lemur, have installed their own filling lines.

For U.S. suppliers of aerosol components, the Canadian market still does not represent much volume. Precision Valve Corp., top U.S. valve maker, exports the bulk of the valves used, while Du Pont has cornered the fluorocarbon market by building a Canadian Freon plant.

In the soaps and detergents business, the major factors are U.S. sub-

\* Factory sales in Canadian dollars; it includes paints and varnishes, and specialty agricultural chemicals.

Widely scattered markets mean distribution costs are usually high



Canadian Germicide Co. Ltd., Cope-land Laboratories Ltd., and Dustbane Mfg. Co. Ltd.

There are about 300 paint and varnish producers in Canada, but the biggest are Canadian Industries Ltd., Sherwin-Williams, Pittsburgh Paints, and International Paint (British-controlled).

**Contradictory Market:** Although the Canadian consumer market is very like the U.S.'s, it does have its own peculiarities and differences. Geography is an important factor — a population of 18 million (4.3 million households) is scattered in a belt 5,400 miles long and about 150 miles wide. Of the three major metropolitan centers, two are in the East (Montreal and Toronto) and one (Vancouver) on the Pacific Coast. It is estimated that 70% of the consumer market lies in the East, with the rest scattered.

This fact, coupled with a smaller-volume market, means higher handling and transportation costs for the specialties company selling in Canada. Although transportation facilities are generally good, freight costs tend to

be high because goods must often be shipped long distances.

In addition, two languages and two cultures coexist in Canada. Labeling of packages in both English and French is standard procedure, although there is no law that requires bilingual labeling. Some 30% of the total potential buyers are French Canadians who are able to read English but prefer French.

The Canadian market for chemical specialties products is almost completely under the sway of U.S. marketers. One reason for this is that residents in its three biggest cities are close to the U.S. border and receive our television and radio programs and hence, our advertising messages.

And U.S. magazines so dominate Canadian newsstands that beginning this month the subject will be investigated by a government commission.

Canadians in general have a lower per-capita income (by about one-third) than U.S. workers, but they do their shopping much the same way. Except in some outlying areas, they buy at shopping centers, self-service supermarkets, and chain stores. The forecast is for a 250% increase in personal, disposable per-capita income by 1980. This is a faster rate of increase than that predicted for the U.S.; however, the Canadian income will still be somewhat behind the U.S.

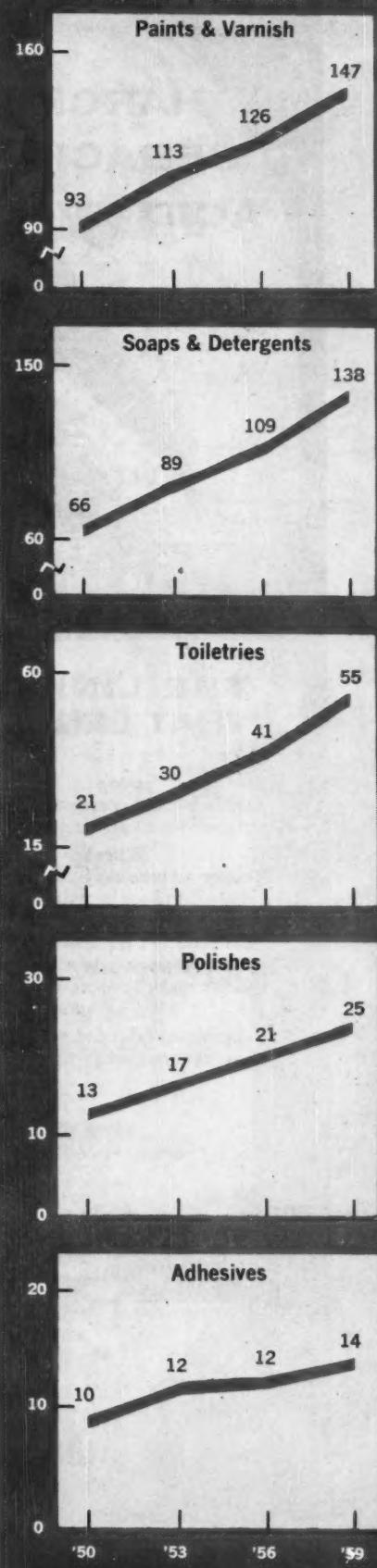
**Import-Export Picture:** In terms of trade, Canada is our biggest foreign supplier and it is also our best customer. In '58, most recent for which official figures are available, the U.S. sold \$3.6 billion worth of goods to Canada, and bought \$2.8 billion. Main U.S. exports are consumer goods, industrial materials, fuels; main purchases are forest products, metals and minerals. Canada's annual chemicals imports from the U.S. are about \$250 million/year. Canada makes only about 500 chemicals, compared with



U.S. TV programs and ads pre-sell consumers in border cities.

## Growth of Specialty Products

(factory level)  
(millions of Canadian dollars)



# HARCHEM SEBACIC ACID

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## THE LINK IN THE CHAIN THAT LENDS PERMANENCE

Because sebatic acid has the longest straight chain of any commercial di-basic acid, it offers permanent resistance to any structural disturbance.

Whether linked with alcohols to make plasticizers or lubricants; with glycols to make polyesters; with diamine to make nylon; with alkyds to formulate paint or coatings; or in researching for new products or improving old ones . . . Harchem 99% Sebatic Acid (CP Grade) gives your product maximum resistance to heat, cold weather, water and chemical or physical abuse.

Result? Improved product performance that stimulates sales and profits for you. Harchem technical personnel stand ready to work with your development people.

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CHEMICAL MATERIALS CATALOG PAGES 173-175



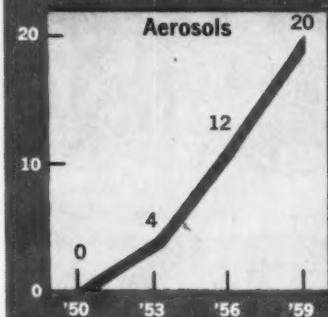
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IN CANADA: W. C. HARDESTY CO. OF CANADA, LTD., TORONTO

## SPECIALTIES

### AEROSOL PRODUCTION

(millions of units)



7,000 to 8,000 produced in the U.S.

In the specialties field, pesticides accounted for the largest volume of Canadian imports last year—some \$14 million. Paints and varnishes and soaps and detergents tied for the second largest groups; about \$6 million of each were purchased from the U.S. Other major specialties products were imported in these amounts: adhesives, \$3 million; perfume and beauty aids, about \$2 million; inks, \$1.8 million; polishes, dressings, \$1.7 million.

**CMCS:** An organization for chemical specialties manufacturers in Canada was born three years ago. Prime motivating factor behind its formation was the prospect of tariff revision. The industry feared that the producers of basic heavy chemicals might be likely to fight for higher over-all tariffs—particularly if the specialties makers were voiceless in the tariff proceedings.

Today the Canadian Manufacturers of Chemical Specialties has a membership of 91 companies. Only a dozen are U.S. firms; and of these, most export raw materials rather than finished products. Of the Canadian members, a large percentage are U.S.-controlled firms.

Some of its stated purposes are to establish better product standards, act as a liaison to the government, to study freight rates and import duties on both raw materials and finished products, and provide publicity and information to the press and public. Although CMCS has no official tie with the U.S.'s Chemical Specialties Manufacturers Assn., it does maintain friendly relations with that group.

As does CSMA, its Canadian counterpart has six divisions: aerosols,

## SPECIALTIES

disinfecting and sanitizing chemicals, waxes and floor finishes, automotive chemicals, detergents, soaps and sanitary chemical products, and insecticides and pesticides. The paint and varnish industry has its own separate association, as do the agricultural chemical producers in Canada.

Perhaps the most important thing to note about the recent CMCS meeting in Montreal last month was the large attendance — for a Canadian trade association. The success with which CMCS has built itself up to its present size in three years is unusual for Canada and particularly remarkable in the chemicals field. This may be contrasted with the basic chemical producers, which have not succeeded in organizing themselves into any effective, corresponding group.

**Big Decision:** Probably the biggest decision to come out of the meeting was that calling for creation of a technical committee, which would study transportation and packaging regulations, tariff rates, legal aspects of industry regulations, and related subjects.

An effort will be made next year to broaden the geographical basis of CMCS membership. Now, member companies are mostly in Ontario and Quebec, where chemical specialties manufacture is concentrated. Though some members may be accepted from outlying provinces, it is likely that membership will continue to be heavily weighted by the Eastern Canadian companies.

**Outlook:** The Canadian specialties industry is forecasting a gain of 8.5% in specialties sales in '61. Helping will be a 15% jump in sales of aerosol products. Also, sizable advances are expected in sales of detergents and sanitary chemical products in the year ahead.

The maturing of the Canadian specialties industry is a fact of which the U.S. specialties industry is becoming increasingly aware. Whether this awareness can be translated into sales for U.S. companies depends greatly on the upcoming tariffs. On the other hand, Canada's desire to capture its maturing markets also hinges on the tariff.

In any case, it is plain that both will have a hand in nurturing this market if it is to be brought along at the fastest pace.

## t-BUTYL PERBENZOATE

**A STABLE NON-VOLATILE LIQUID PEROXYESTER USED AS A HIGH TEMPERATURE CATALYST**

### SPECIFICATIONS

t-BUTYL PERBENZOATE 95.0% (Min.)  
Active Oxygen 7.8% (Min.)

THERMAL DECOMPOSITION DATA	Solvent	Concentration (Moles/liter)	Temperature (°C.)	Half-Life (Hours)
	Benzene	0.2	85	130.0
			100	18.0
			115	3.1
			130	0.55

Excellent results are obtained by utilizing t-BUTYL PERBENZOATE for the polymerization of acrylates and the high temperature curing of polyesters. This liquid peroxyester has also found wide-spread use in the preparation or compounding of various silicones, silicone rubbers and polyethylene. Details on many other varied applications on request.

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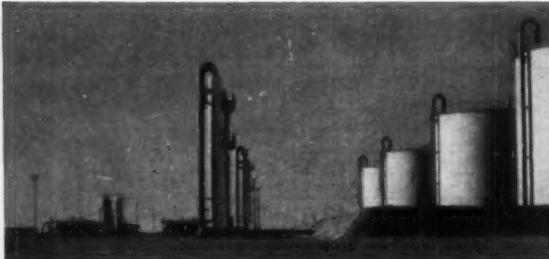


ENGINEERS AND CONSTRUCTORS FOR INDUSTRY

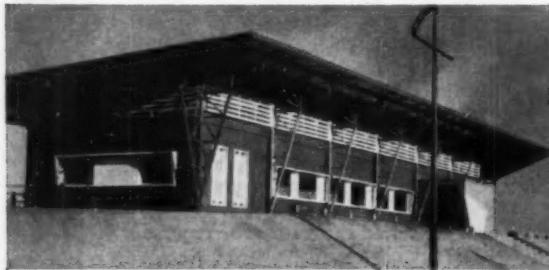
## NEW PROCESSING PLANT AT HASSI-MESSAOUD STABILIZES 150,000 B/SD OF LIGHT CRUDE

The S. N. REPAL permanent field processing plant at Hassi-Messaoud, Algeria, is now operating at its capacity of 150,000 barrels per stream day of stabilized crude oil. The installation gathers, degasses, stores and transports a very light crude (0.8 sp. gr.) produced at the four-year-old Hassi-Messaoud field and destined for the Haoud El Hamra-Bougie pipeline to the Mediterranean. It was built by Societe Francaise des Techniques

General view of the Hassi-Messaoud plant, showing vertical, third stage separators (center), part of horizontal separators, and four intermediate storage tanks.



Rear view of control house with its specially-designed roof for Saharan climatic conditions.



Lummus in this remote location, under extreme climatic conditions, in less than nine months from the time materials began to arrive at the site—and was completed ahead of schedule.

In May, 1958, Societe Francaise des Techniques Lummus was assigned the task of planning, engineering and constructing the plant, the primary purpose of which is to remove the very large quantities of natural gas associated with the Hassi-Messaoud crude (gas: oil ratio by volume is about 200:1). A temporary installation handling limited crude capacity existed at the site when the Lummus company was called in.

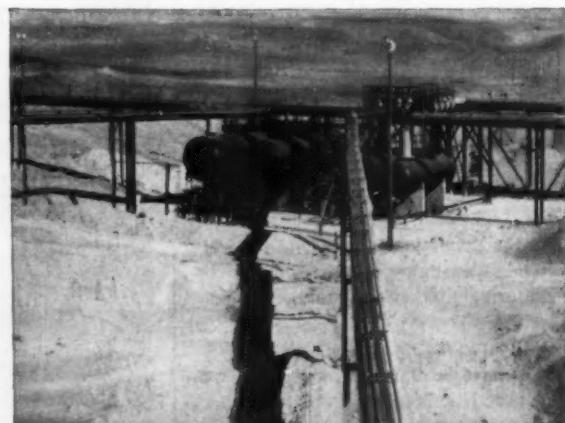
By September, 1958, plans were completed and purchasing began. Almost all the materials were bought in France or Algeria. However, electronic control apparatus was obtained in the United States. Over 4,000 tons of material were transported across the Mediterranean Sea, the Atlas Mountains, and the desert to arrive at a rocky plateau rising about 100 feet above the old dry valley of Oued Irara.

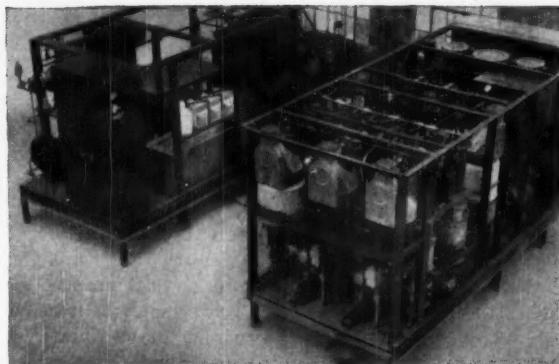
In addition to transportation difficulties, Societe Francaise des Techniques Lummus had these handicaps to overcome during construction proper, which got underway in January, 1959: a water table lying 150 feet deep, which posed problems in electrical grounding of equipment; conducting the major part of the work during the hottest months, with temperatures ranging from 104-130°F.; violent sand and dust storms, characteristic of the area.

In spite of the problems, on September 24, 1959—ahead of schedule—the gas separators were put into operation and the flares lit. The first shipments through a 16-inch pipeline to Haoud El Hamra Terminal, 19 miles away, began shortly thereafter.

SFTL is one of the seven International Groups of Lummus companies which circle the globe to serve the process industries wherever plant design, engineering and construction are needed.

The condensate drums and control station with the high and low pressure flares.





Two skids hold complete nitrous oxide plant ready to move to location in "flying boxcar."

## Portable Nitrous Oxide Generator Being Constructed for U. S. Army Engineers

Design, construction and testing of a portable nitrous oxide generator for the U. S. Army Corps of Engineers is being carried out by The Lummus Company at its Engineering Development Center, Newark, N. J.

The plant will afford a field supply of 40 lb. per hr. of liquid anesthesia for use under combat conditions, at a cost of about \$250,000 per generator. The process, specified by the Army, is conventional decomposition of ammonium nitrate by heat. Ammonium nitrate can be shipped in bags, eliminating the return of empty anesthesia cylinders which presently causes problems.

### Over a half-century of Process-Industry experience

Here is just a partial list of chemicals for which Lummus has designed, engineered or constructed plants:

Acetone	Dichlorethane	Nitric acid
Acrolein	Dichlorobenzene	Phenol
Allethrin	Di-isobutyl alcohol	Phthalic anhydride
Ammonia	Ethylbenzene	Polyvinyl alcohol
Ammonium nitrate	Ethyl chloride	Polyvinyl pyrrolidone
Ammonium sulfate	Ethylene	Propargyl alcohol
Benzol	Ethylene glycol	Propylene
Beryllium metal	Ethylene oxide	Pyrrolidone
Bisphenol	Epon® resin	Styrene
Butadiene	Formaldehyde	Sulfuric acid
Butanediol	Heavy water	Surfactants
Butynediol	Hydrogen	Tetramer
Butyrolactone	Hydrogen sulfide	Trichlorethylene
Carbon black	Isopropyl alcohol	Trichlorobenzene
Caustic soda	Lamp black	Toluene
Chlorobenzene	Magnesium sulfate	Uranium oxide
Cumene	Mercuric nitrate	Vinyl acetate
Di-ammonium phosphate	Naphthalene	Vinyl pyrrolidone

Discuss your next chemical or petrochemical project with a Lummus representative.

**THE LUMMUS COMPANY**, 385 Madison Avenue, New York 17, N. Y.; Houston, Washington, D. C.; Montreal, London, Paris, The Hague, Madrid. **Engineering Development Center**: Newark, N. J.

Dimensions of the unit were dictated by the size of the rear door of a "flying boxcar". As designed, the plant is mounted on two skids, eight feet square by 20 feet long. It has shock and thrust resistance for portability by plane, train or truck. It is simple enough for operation by soldiers getting instruction from a manual.

The nitrous oxide product meets USP purity requirements.

The equipment in the unit includes:

#### On the first skid

Ammonium nitrate melting pots of aluminum.

Decomposition vessels of aluminum.

Caustic, sulfuric acid and steel wool scrubbers

made of glass-fiber-reinforced polyester resin.

Packings for the caustic and acid scrubbers are polyethylene Tellerettes.

#### On the second skid

Compressor of a type that compresses gas by flexing a diaphragm with hydraulic fluid.

Hot KOH absorber.

Desiccator.

Liquefier — a 1 1/4-ton fluorinated hydrocarbon refrigeration unit.

Stripper.

#### Bridging the two skids

A plastic gas-surge bag of 300 cu. ft. capacity which weighs only 30 pounds and folds up into a small bundle for storage. It consists of an inner envelope of vinyl plastic sheeting and an outer casing of vinyl-impregnated nylon fabric. It was specially designed for this portable plant.

Because parameters set by the Army pose many problems in selection of materials of construction, selection and positioning of equipment and instrumentation, Lummus' Engineering Development Center will provide the Army with an R&D prototype unit which may save them a great deal of expense and inconvenience.

### FMC selects Lummus as principal sub-contractor on new Army Chemical Corps Contract

A new Army contract for a Chemical Corps production facility near Newport, Indiana, in excess of \$13,000,000, has been awarded to the Food Machinery & Chemical Corporation. The contract calls for the design, construction and test operation of a plant to produce classified material. The Lummus Company has been selected as principal sub-contractor to design, construct and assist in test operation. Food Machinery & Chemical Corporation have the responsibility for operating this government-owned contractor-operated facility for some period to follow.



Recruiters find good-quality new sales talent is still scarce.

## Sizing Up New Sales Talent

During the next few weeks, as CPI marketing men put the final touches to their '61 plans, one of their chief concerns will involve new manpower—finding enough top-notch sales candidates. The perennial shortage of good sales talent is already pinching some CPI firms that fell short of their '60 quotas, and the '61 recruitment season promises to be a lively challenge.

That's the consensus of sales managers, personnel recruitment officials and employment agency directors polled recently by *CHEMICAL WEEK*. Behind their comments is a seeming paradox: while most CPI sales recruiters are finding it difficult to attract enough talented candidates, there's persistent talk in some quarters about the growing popularity of sales and marketing careers. According to some observers (primarily employment agency spokesmen), there is a greater number of likely sales candidates than ever before.

*CHEMICAL WEEK*'s survey finds little to support the latter view. Rather, it seems much more probable that sales recruiters are up against many of their usual problems this year with

little hope of any significant rise in the number of qualified, available sales candidates.

**Broad Picture:** Although many chemical producers have not yet settled on their final marketing manpower objectives and plans for '61, early signs point to over-all needs similar to those of '60, perhaps down just a shade. That's because many companies filled their quotas last year, will be seeking fewer this time (*CW*, Oct. 29, p. 95).

Admittedly, manpower quotas may not be determined until companies resolve '61's economic puzzle. But most of the larger firms say they have not yet reduced '61 recruiting quotas, probably will not cut back their sales recruiting next year for this reason.

Best guess on salaries: about a 2% gain for B.S. graduates in chemistry or chemical engineering, bringing starting salaries to something like \$520-550/month for new sales talent. (Current rates: about \$500-540/month.)

**Manpower Climate:** What factors affect the future "crop" of salesmen?

Helping to ease the competition for

sales-oriented technical graduates is the situation faced by both steel and petroleum producers—both are known to be drawing off fewer chemists and chemical engineers because of the slump in their businesses.

Also, the armed services are taking far fewer new employees than they had been in recent years. What's more, there are large numbers of service returnees. The result, according to the more hopeful observers, is that many companies will have less trouble meeting their sales talent needs in '61.

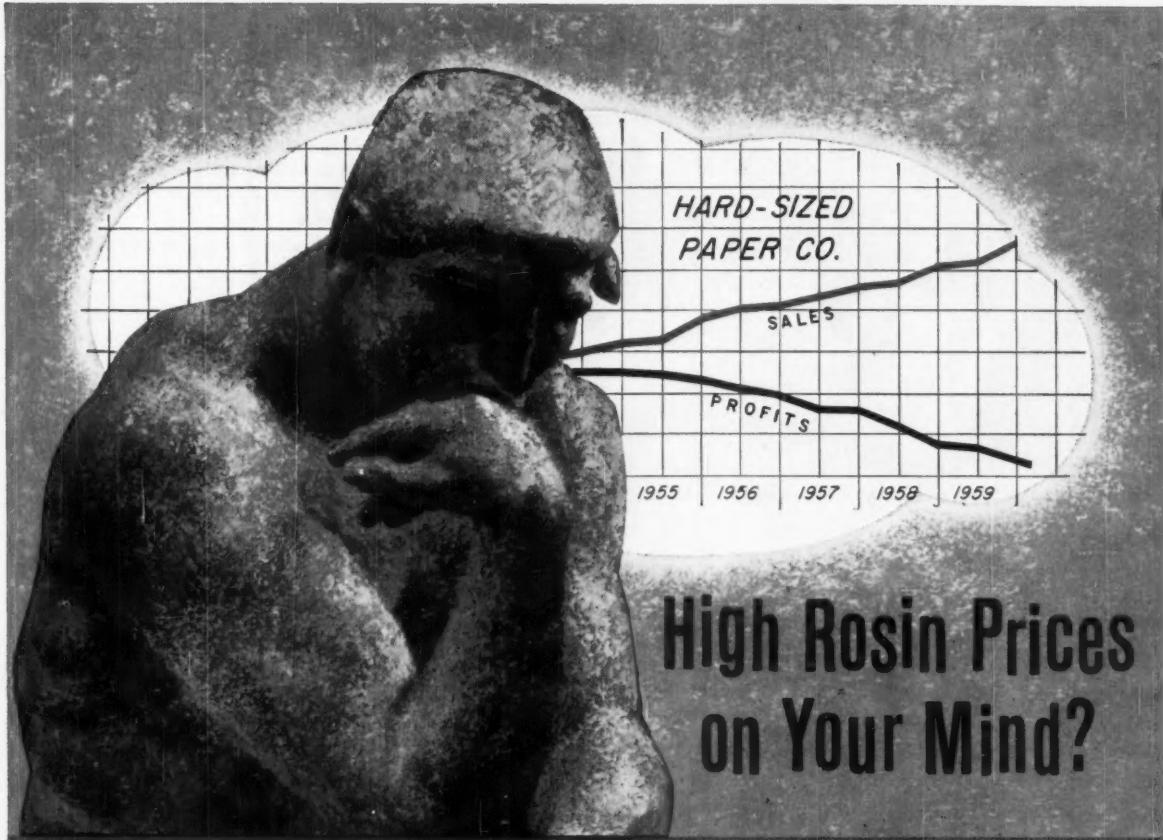
**Still Looking Hard:** But even if there is a rise in the numbers of likely new chemical sales trainees now, pessimists call it a short-term matter. Their reasons:

- Engineering school enrollments are dropping.
- There is a growing "antisales" attitude among students.
- The so-called "glamor" of selling seems to be fading.

Engineering enrollment of U.S. colleges and universities (considered a prime source of sales talent) has dropped for two successive years. And recruiters note that the nation's concern with scientific and technological achievements may have dimmed the attractiveness of sales jobs. Just as important, say some recruiters, is the reluctance of many potential sales candidates to spend time training or selling in many cities. San Francisco and New York, of course, always attract sales candidates, but many other cities and towns don't.

Backing up the sales recruiters' ideas about antisales attitudes is a recent study conducted by *Scholastic Magazine's* Institute of Student Opinion. That study revealed that sales careers rated lowest among 18 career fields in the eyes of 12,000 college and high school students. Less than 1% of them stated a preference for selling. Advertising, public relations, civil service, farming and teaching all rated much better than the rating given sales careers.

**Intracompany Moves:** Nonetheless, chemical recruitment officers agree there's strong interest in marketing careers among the younger, aggressive, technically trained men who are now in research, engineer-



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Sulfuric Acid • Methanol

REICHHOLD CHEMICALS, INC.  
RCI BUILDING, WHITE PLAINS, N.Y.



**Challenge for CPI recruiters: students' low regard for sales jobs.**

ing or production. Main attractions: high salaries, possibility of more rapid advancement.

At the same time, however, the rate of transfers to sales or other marketing positions is quite low. Several firms describe such moves as "rare." Main reasons: such men face rigorous screening, and their own departments do all they can to hold on to them.

**Outlook:** Despite encouragement from those who believe the search for good chemical sales manpower is easing, most recruiters look for a continuation of the relatively difficult times of the last two years. The supply may more nearly satisfy demand next year, but with '61's prospects looming as a "hard-sell year," most CPI firms will be out to get the best marketing talent they can. Most sales managers admit they are getting set for rougher competition in the years ahead, and few will deny that skilled manpower is their most valuable weapon.

### Dressing Up Multiwalls

Multiwall bags, workhorses of the CPI, are getting the look of consumer packaging with new emphasis on color and creative design. A survey by the Multiwall Bag Division of West Virginia Pulp and Paper Co. uncovered the ideas behind the industries' interest in revamping their once utilitarian bags: more intense competition, improvements in bag-printing techniques and internal packaging-improvement programs.

But what effect would a new design have in an area of selling where art is apparently of minimum importance to the industry?

West Virginia's survey helped answer the question. The main advantages of good design, according to the industries polled: it emphasizes quality of product, keeps company name before customers and, to a lesser degree, helps sell at point of purchase. Having a modern appearance alone gives buyers, the manufacturers said, the picture of a progressive company with better-than-average products.

These answers will guide West Virginia's new creative design service, recently set up to study new approaches to printing, color and layout, translating them into a series of preliminary and finished designs—without cost to the customer. Victor (Mike) Luke, Multiwall Bag Division manager, said that Bradbury Thompson of Riverside, Conn., has been retained as design consultant. Already three major customers have approved proposed changes, and several others are considering possible revisions.

Industries polled by West Virginia in preparation for the new design department included cement, feed, seed, fertilizer and chemicals—commodities that are not subject to "impulse" buying. Of the 38 companies interviewed, only one did not attach more importance to color, design and printing on its multiwall bags than it did five years ago.

Over half of the chemical process companies questioned expressed satisfaction with existing designs, although most said it had been a year to five years since their multiwall designs had been updated. However, all said their changes would help packaging appearance, and most of the processors endorsed designs more in line with supermarket trends. The companies

were split over design emphasis—whether to stress the product or the company—but they agreed that layout and design added more advertising impact than color or even quality of printing.

Rounding up a picture of the possible market for its services, West Virginia asked its customers about whom they consulted for new design ideas. In the CPI, most companies left this up to the advertising agencies; some had their own specialists or went to other outside sources—none said that it relied on its multiwall supplier. This told West Virginia that it had an excellent opportunity to offer a new service and save its customers money in the process.

With this background survey as a guide, West Virginia launched its creative design service; and, though it's too soon to measure tangible results, Division Manager Luke says preliminary interest has been exceptionally high, and multiwall printing and design should take on new stature and new sales significance as a result.

### Alcohol Tax Guide

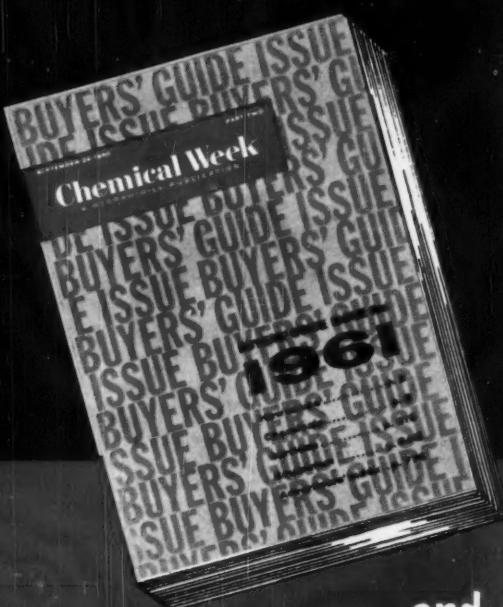
**U. S. Industrial Chemicals Co. (division of National Distillers and Chemical Corp.)** is now distributing the first copies of a newly revised booklet aimed at boosting ethyl alcohol (ethanol) sales.

It's a guide to revised federal government regulations governing the production, sale and consumption of pure and denatured ethyl alcohol.

USI is banking on the handy, 20-page, paperback booklet to provide some promotional push to the difficult job of selling tightly regulated ethyl alcohol. The publication describes rules governing the storage, marking, labeling and general handling of pure ethyl alcohol; lists tax-free industrial alcohol and various kinds of denatured alcohol products; includes complete references to original federal regulations; and contains charts showing actions required by sellers and users of ethyl alcohol products to comply with the regulations; and a map of the Internal Revenue Service's Alcohol and Tobacco Division offices.

**Recent Rule Changes:** The guide is a revision of a previous guide, issued last year along with a hard-cover book on the properties, specifications

To the 409 suppliers  
who are adding new customers  
and making more sales right now  
in the "Shopping Center" pages  
of **Chemical Week's**  
**BUYERS' GUIDE ISSUE** . . .



Now that you know how effectively it really works, what better time to budget your selling space for next year's edition? All of the service features of the issue that's now working its head off for you . . . plus several new aids to CPI-Management already being planned for next year . . . plus more equipment companies in the listings, more types of CPI equipment covered . . . plus restyled cover and content . . . more complete, comprehensive, convenient-to-use than ever!

... and to the next 409 suppliers  
that 45,000 buyers never missed  
because they never knew (who, and where and  
what you make). Better get the **BUYERS' GUIDE**  
in your budget...yes, right now for the 1961 issue!

# Chemical Week

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## ADVERTISING STAFF

Atlanta 9	Michael Miller 1375 Peachtree St., N.E. TRinity 5-0523	Detroit 26	H. J. Sweger, Jr., 856 Penobscot Bldg., Woodward 2-1793	New York 36	Charles Haines, B. A. Johnson, Paul F. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXFORD 5-5959
Boston 16	Paul F. McPherson, Copley Square, COngress 2-1160	Frankfurt/Main	Stanley Kimes, 85 Westendstrasse, Germany	Philadelphia 3	William B. Hannum, Jr., J.E.B. Ladouceur, 6 Penn Center Plaza, LOcust 8-4330
Chicago 11	Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800	Geneva	Michael R. Zeynel 2 Place du Port, Geneva, Switz.	Pittsburgh 22	Duncan C. Stephen, 4 Gateway Center, EXpress 1-1314
Cleveland 13	H. J. Sweger, Duncan C. Stephens 1164 Illuminating Bldg., 55 Public Square, SUperior 1-7000	Houston 25	Gene Holland W-724 Prudential Bldg., JACKSON 6-1281	Portland 4	Scott B. Hubbard Room 445, Pacific Bldg.
Dallas 1	Gordon Jones, John Grant 901 Vaughan Bldg., 1712 Commerce St., RIVERSIDE 7-9721	London E.C. 4	E. E. Schirmer, N. Murphy, McGraw-Hill House, 95 Farringdon St., England.	St. Louis 8	R. J. Claussen 3615 Olive St., Continental Bldg., JEFFERSON 5-4867
Denver 2	J. Patten, 1740 Broadway, ALpine 5-2981	Los Angeles 17	Robert Yocom, 1125 West Sixth St., HUNtley 2-5450	San Francisco 4	William C. Woolston 68 Post St., DOuglas 2-4600

## SALES

and uses of ethyl alcohol.

At that time, USI figured the then-current federal regulations might change, prepared its guide as a paperback supplement to the complete alcohol data book.

The move figures as a wise one, for within a year (by July 1, '60) revised federal alcohol regulations came into effect, making the first supplement obsolete. Now the revision is going out to USI alcohol customers to help them find their way through the complicated federal rules.

**Aiding Sales:** During the late '40s several alcohol producers made similar pamphlets available to their customers. However, USI's edition is described as the most current and comprehensive.

One measure of how the industry takes to the new rule guide: some of USI's first requests for copies came from its toughest competitors.

## DATA DIGEST

• **Acrylic Emulsions:** New, eight-page technical bulletin (L-2) describes the use and properties of acrylic polymer emulsions for tannery leather finishes. Booklet contains a general description of various types of emulsions in the product series, details of physical properties, and formulation information and suggestions. Polyvinyl Chemicals, Inc. (26 Howley St., Peabody, Mass.).

• **Chlorinated Paraffins:** Brochure lists available chlorinated paraffins from highly fluid liquid grades to the resin grades, with chlorine contents varying from 40 to 80%. Dover Chemical Corp. (Dover, O.).

• **Container Cranes:** New bulletin (No. 248) cites general advantages and particular features of two new types of land-based cargo container cranes. Both cranes, the tower type and the bridge type, are all-welded traveling structures of man-trolley design, with lifting capacities up to 30 tons. Dravo Corp., Materials Handling Dept. (Pittsburgh 25, Pa.).

• **Phosphorescent Materials:** New bibliography lists more than 200 compounds, their excitation and emission wave lengths, wave length mean lifetime, and information references, as a guide to identifying solutions through their phosphorescent properties. American Instrument Co., Inc. (8030 Georgia Ave., Silver Spring, Md.).

# Tracers

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PROCESS  
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## POSITIONS VACANT

**Manager Required** for small bulk chemical storage plant in Newark, New York Area. Chemical Degree and knowledge of Chlorinated Hydrocarbons preferred but not essential. Salary Range: \$7,500.00—\$9,500.00. P-5615, Chemical Week.

**Technical Service Representative with experience** in heavy chemical industry including technical customer service, technical writing or product literature preparation; B.S. Chemical Engineer, U.S. citizenship. Send resume to B. L. Chandler, American Potash & Chemical Corporation, 3000 W. 6th St., Los Angeles, California.

**Heavy Chemicals—Operating and process engineers** required for expansion program and operating of new plants under construction. Particular immediate interest in personnel with experience relative to Sulfuric and Hydrofluoric Acids. Dixon Chemicals, 1260 Broad Street, Bloomfield, New Jersey.

**Research Scientists—Established food manufacturer** with foreign subsidiaries needs young scientists in Research and Development Department of its New Jersey division. Applicants must have first-class academic background in some branch of experimental science. Some research experience, either academic (Ph.D.) or industrial, is essential; knowledge of the food industry is helpful but not necessary. Adaptability to cooperating with European colleagues is important and availability for possible occasional trips to Europe required. Starting salary will be in five figures depending upon qualifications. Fringe benefits are exceptionally liberal and opportunity for advancement will be commensurate with performance. Our modern plant is located in scenic rural section of New Jersey, fifty miles from N.Y.C. We pay moving expenses. Please send complete resume of your qualifications and fields of interest. Current affiliations will not be investigated without permission. P-5465, Chemical Week.

## POSITIONS WANTED

**Chemical Engineer, broad experience technical** and commercial lines, seeks opportunity to represent an American manufacturer in France and adjoining countries of common and free markets. Ability to develop selling ideas and manufacturing facilities. Speak fluently English, French, Russian, knowledge German and Italian. PW-5624, Chemical Week.

**Administrative position with progressive company.** M.S. in Chemistry with 20 years diversified experience incl. Research, Development, & Production. Three years Plant Supt., five years Works Manager. Excellent public and industrial relations record. PW-5646, Chemical Week.

**Microbiologist-Biochemist, Ph.D., four years industrial experience.** Patents and Publications. Desires position with small or large company. PW-5647, Chemical Week.

## SELLING OPPORTUNITY AVAILABLE

**Wanted—Chemical Salesman with imagination.** We have excess capacity in large Pfaudler and similar reactors located in Georgia. What can we make that you can sell at a profit? SW-5589, Chemical Week.

## EXPORT REPRESENTATIONS WANTED

Well estab., aggressive N. Y. Chemical Export firm with branch offices & competent sales agents throughout world, seeks representation from Mfrs. of Petrochemicals & Allied Products. Excellent results assured. RA-5533, Chemical Week.

## CONTRACT WORK WANTED

**Contract Fermentation—Have modern stainless steel fermenters.** Handle bacterial, fungal and streptomyces fermentations, etc. Excellent laboratory facilities. CWW-5506, Chemical Week.

**Custom Grinding—Ultra Fine or Coarse-Specialty** or Volume Blending and Grinding service on unit or contract basis. Complete CO<sub>2</sub> installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. Central Avenue, Box 682, Oak Lawn, Illinois.

## PROFESSIONAL SERVICES

**Clark Microanalytical Laboratory—CH. M. S.** Halogen, Fluorine, Oxygen, Alkoxy, Alkamide, Acetyl, Terminal Methyl, etc. by specialist in organic microchemical analysis. P.O. Box 17, Urbana, Ill., Empire 7-8406.

## BUSINESS OPPORTUNITY

**Wanted: Patents and/or Licensee arrangement,** reputable California chemical corporation with facilities in the common markets of Japan and Mexico, interested in additional chemical items for manufacturing and distribution. Petroleum, marine and other specialized applications to industry. All information treated confidential. BO-5594, Chemical Week.

**European Chemical Co. has need for a Consultant:** Surface Coating Resins. We demand process improvement new processes-application know how etc. Contact: Havas Paris n°232/598, 17 rue Vivienne Paris 2<sup>e</sup> (France).

## CHEMICALS FOR SALE

**60 Lb/pk. Aluminum Stearate 32¢ lb. Bulk D.O.S.** Plast. 32¢/lb. (dark). Bulk DBS Plast. 33¢/lb. w/w. Bulk Acetone Redistilled 43¢/gal. Monochlorobenzene-Bulk. 25,000 7¢/lb. FS-5611, Chemical Week.

## EQUIPMENT FOR SALE

**Liquidation, \$8,000,000 Alcohol Plant at Omaha,** Nebraska. Dryers, Filters, Stills, Evaporators, Exchangers, Tanks, Pumps, etc. Send for circular. Perry, 1415 N. Sixth St., Phila. 22, Pa.

**2500 gal. T316 SS. Tank, 7' x 7', Vert., dished heads, 70# WP, 3 HP prop. agit.** Perry Equipment Corp., 1415 N. Sixth St., Phila. 22, Pa.

**Epoxy Resins Plant for sale. 65,000 sq. ft.** Fully equipped. Ready to roll. Large water capacity. 113 acres. Eastern Penna. Robert N. Jordan, Bear Ridge, Phila. 40, Pa., Baldwin 8-0200. Brochure available.

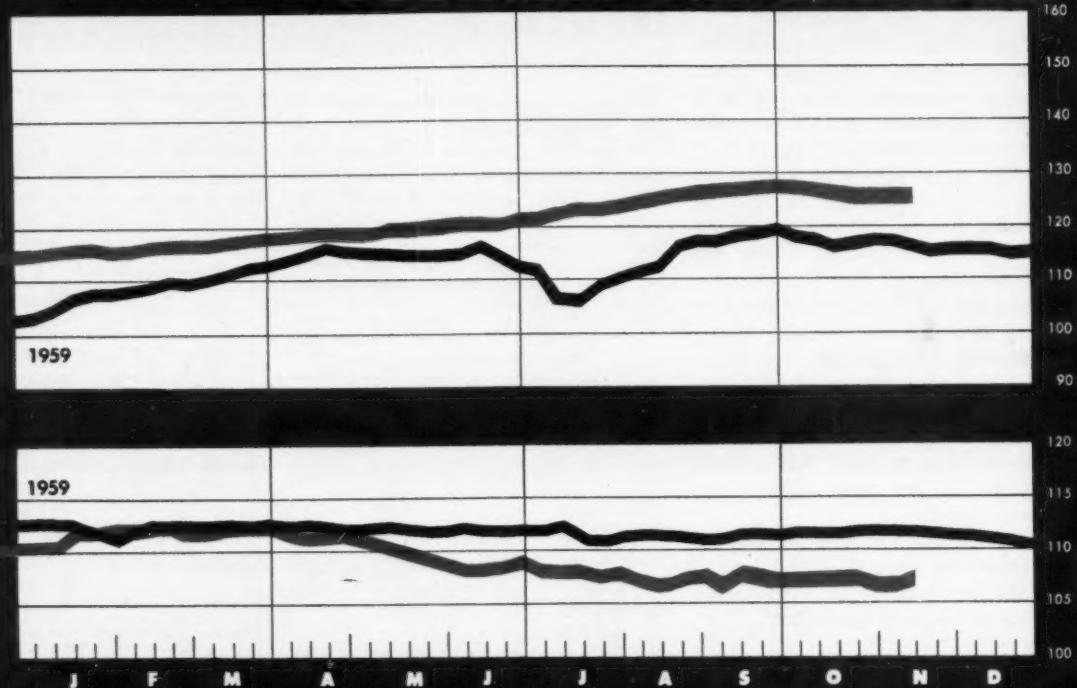
**1350 gal. T347 Stainless Jacketed Kettle, 1/4"** flat top, anchor and paddle agitator, reducer etc. Perry, 1415 N. 6th St., Phila. 22, Pa.

**1960 sq. ft. T316 Stainless Horizontal Heat Exchanger, ASME 75# W.P.** Perry Equipment Corp., 1415 N. Sixth St., Philadelphia 22, Pa.

## MISCELLANEOUS

**To Employers Who Advertise for Men:** The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideration.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide. We can guarantee that Every Advertisement Printed Is Duly Authorized. Now, won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company, "Put Yourself in the Place of the Other Fellow."

# BUSINESS BENCHMARKS



NOVEMBER 19, 1960

#### WEEKLY BUSINESS INDICATORS

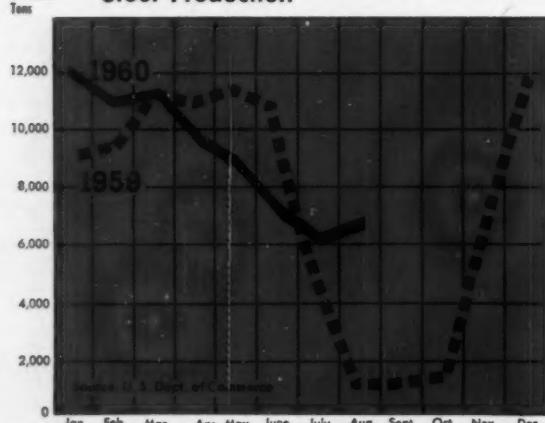
	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	125.0	125.1	116.1
Chemical Week wholesale price index (1947=100)	107.3	106.5	110.9
Stock price index (12 firms, Standard & Poor's)	46.79	45.24	58.98
Steel ingot output (thousand tons)	1,478	1,473	1,300
Electric power (million kilowatt-hours)	13,982	13,883	13,019
Crude oil and condensate (daily av., thousand bbls.)	6,940	6,821	6,899

#### WHOLESALE PRICES INDICATORS 1947-49=100

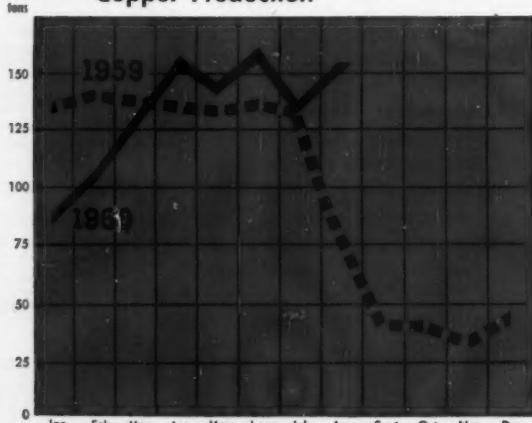
	Latest Month	Preceding Month	Year Ago
All commodities (other than farm and foods)	128.0	128.2	128.4
Chemicals and allied products	110.5	110.5	109.9
Industrial chemicals	124.6	124.6	123.8
Paint and paint materials	119.7	119.9	118.7
Drugs, pharmaceuticals and cosmetics	95.2	95.4	93.7
Fats and oils (inedible)	47.7	48.9	55.0
Fertilizer and materials	108.4	108.4	105.2

#### CHEMICAL CUSTOMERS CLOSE-UP

##### Steel Production



##### Copper Production





GULF . . . AND THE REMARKABLE PROGRESS OF PETROCHEMICALS

### IN ASTRONAUTICS . . .

The avenues to outer space are paved with products from the earth's rich natural resources. Today rocket propellants get their thrust from petroleum hydrocarbons combined with liquid oxygen. And tomorrow from polystyrene-butadiene polymers, butyl rubber, resins and nitroglycerin compositions. Heat-resistant phenolic plastics hurtle through the ionosphere as nose cones, rocket fins, body panels. And as man himself takes his first tentative steps into space, the need grows for high-temperature transparent plastics for use in cockpits, portholes and windows. Someday, the astronaut will be able to leave his ship in outer space, in a pressure suit of nylon and neoprene.

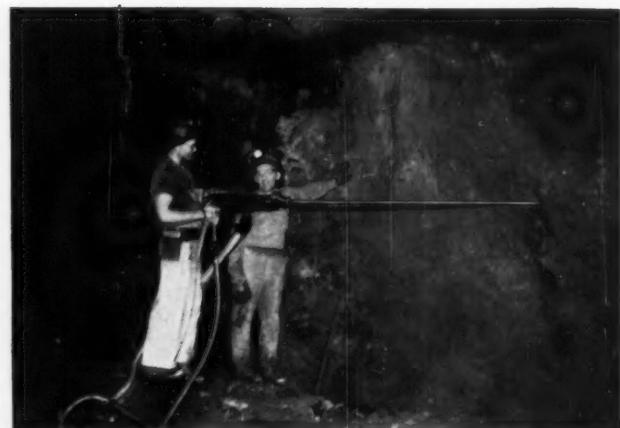
Many of the answers to interplanetary travel have been found through chemistry. Still hundreds more—perhaps thousands—must be found. If you have made this your challenge, Gulf would like to supply you with the pure, high quality petrochemicals you need. For further details, write Petrochemicals Department Sales Office, Gulf Oil Corporation, 360 Lexington Avenue, New York 17, New York.

Quality Petrochemicals to Begin With

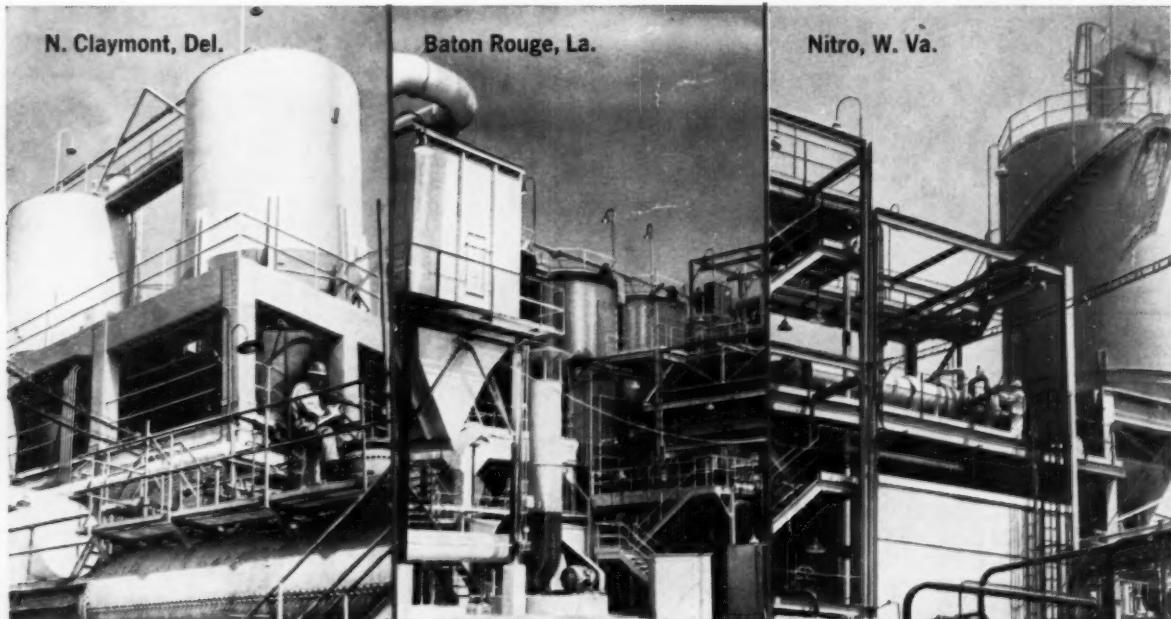


Benzene • Cyclohexane •  
Ethylene • Isooctyl Alcohol •  
Propylene • Propylene  
Trimer and Tetramer •  
Sulfur • Toluene

# BASIC REASONS FOR MAKING GENERAL CHEMICAL YOUR "HQ" FOR HF



**EXTENSIVE FLUORSPAR RESOURCES.** Basic to the point of owning large fluorspar reserves as well as mines and mills, General Chemical is the nation's leading producer of hydrofluoric acid. By controlling its raw material resources, General Chemical protects you against interruptions of supply.



**3 PLANTS.** General Chemical produces anhydrous and aqueous hydrofluoric acid at the following three locations: North Claymont, Delaware; Nitro, West Virginia; and Baton Rouge, Louisiana.



**5 STOCK POINTS.** General has five bulk storage and packing stations in the United States for aqueous HF. Each backs up the others—assuring availability and prompt service at all times.

With its outstanding resources for essential raw materials—fluorspar reserves, mines and mills—plus a broad network of 18 sulfuric acid plants, General Chemical's **basic** position in hydrofluoric acid production is unmatched.

What's more, General is the **only** supplier offering shipment of hydrofluoric acid from more than one producing location. It supplies **anhydrous** and **aqueous** HF to its customers from **three** producing works and **aqueous** HF from an additional **five** company-owned locations.

Whenever and wherever you need hydrofluoric acid, call on General Chemical—your "HQ" for HF!



**GENERAL CHEMICAL DIVISION**  
40 Rector Street, New York 6, N. Y.

